...HNOLOGY DEPARTMENT

The Refrigeration Service Engineer

VOL. 15 NO. 1 ★ ★ ★ JANUARY · 1947

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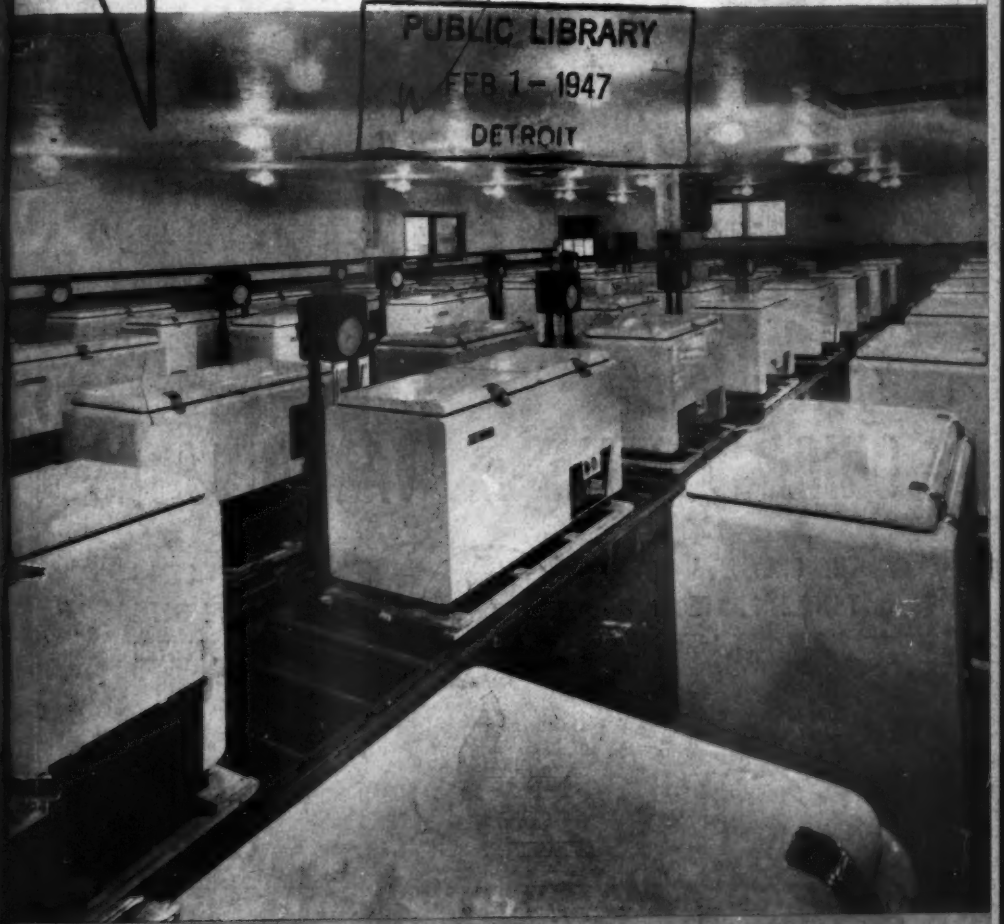
DETROIT



Refrigerant Control for Low Temperature Systems.
Charging and Starting Air Conditioning Systems.
Operation and Servicing Coldspot Home Freezers.

✓R v.15 1947

"I'M TICKLED PINK"

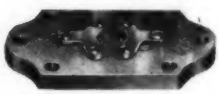
With the Performance of

CHICAGO SEALS *and* VALVE PLATES

THE ONLY SEAL WITH TRIPLE PROTECTION AGAINST LEAKS

PERFECT BALANCE

REPLACEABLE SEALS ARE EXCLUSIVE WITH CHICAGO VALVE PLATES



Chicago Seals
MODERN DESIGN

CHICAGO SEAL CO. 20 N. WACKER DR., CHICAGO 6, ILL.

Tech.

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 44, Ill. Published monthly, Vol. 15, No. 1, January, 1947. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

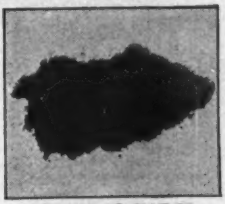
The Ansul Research Staff
REPORTS ON:

SLUDGES

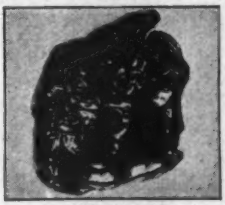
Approximately 90% of the sludges produced in refrigerating systems are due to moisture. The exact cause can always be determined by analysis, but the appearance of the sludge (see photos) is usually indicative of the cause.

SLUDGE DERIVED FROM MOISTURE— If water is present in a machine, the nature of the sludge depends upon the type of refrigerant and length of time the water is present. All refrigerants ... sulfur dioxide, methyl chloride, Carrene and "Freon-12" ... react with water to produce corrosion products characteristic of each. To prevent sludge, the amount of water present in a refrigerating system must be small enough to avoid ice separation and corrosion. For "Freon-12" and methyl chloride, a quantity of water approximately .05% by weight will cause corrosion; the limit is somewhat higher for sulfur dioxide.

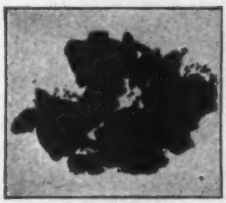
SLUDGE DERIVED FROM OILS—Oil sludges are characterized by total or partial solubility in carbon tetrachloride, gasoline and similar solvents. It is generally presumed that oil sludges are due to two causes: (1) an interaction between the unsaturated constituents of the oil and the refrigerant; (2) a breakdown of the oil due to heat, oxidation, friction, etc.



GRANULAR SLUDGE
... due to moisture



FLUID SLUDGE
... due to oil



HARD SLUDGE
.. due to moisture and oil

SEND FOR "SLUDGES" by Ansul Research Staff
A detailed analysis of the refrigeration sludge problem.

ANSUL WHOLESALERS are ready and equipped to render an intelligent, cooperative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

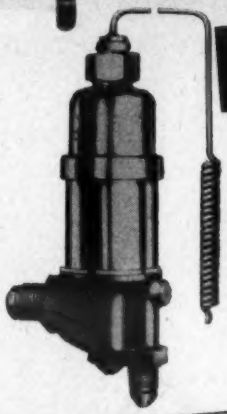
FOR EXAMPLE:
The Ansul Research staff has developed a method for analysis of sludges. This analysis usually gives the answer as to the origin of the sludge. If you have a sludge problem, send a sample of the sludge with pertinent information to the Ansul Research Laboratory through your Ansul wholesaler. An analysis report will be made for you without charge.

Ansul Refrigerants are available at leading wholesalers everywhere.

*REG. U. S. PAT. OFF.

ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN
DISTRIBUTORS FOR KINETIC'S "FREON-11," "FREON-12," "FREON-21," "FREON-22" AND "FREON-113"

"DETROIT"
HALLMARK OF THE BEST
In Thermostatic Expansion Valves
This trademark on a thermostatic expansion valve indicates that it is top quality—a valve that you can be sure will give superior performance over a long period. "Detroit" Valves have been the standby of refrigeration men everywhere for many years. Easy to install—easy to adjust. Try these valves on your next suitable job.



NO. 673—"THE STANDARD OF THE REFRIGERATION INDUSTRY"

"Detroit" No. 673 has a long record of dependable performance in a wide variety of installations, and has been, for many years, "the standard of the refrigeration industry". Designed for average size commercial and air conditioning installations. Sensitive and accurate in operation—gas charged for instant response and reduction of motor load during pull-down cycle. Duraflex bellows and Delubaloy needles and seats resist corrosion and assure long life.

UNIT NUMBERS OF NO. 673 VALVE

Stock Items with Your "Detroit" Wholesaler
Use "Detroit" Unit Numbers when Ordering

Unit No.	Refrigerant	Max. Pressure	Connection
6731968	Freon-12	15	Inlet ⅜" SAE for ⅜" x ¼" reducing nut. Outlet ½" SAE
6731428	Freon-12	55	
6731563	Methyl	10	
6731411	Methyl	40	

Rated at 1 ton Freon-12 or 2 ton Methyl

No. 573—THE SAME SUPERIOR PERFORMANCE AS THE NO. 673 FOR SMALLER INSTALLATIONS

This valve, in ½ ton (Freon-12) capacity, has the quality and operating characteristics of No. 673. Designed for small commercial installations, its double diaphragm gas charged power element permits close superheat control at low suction pressures and provides motor overload protection in its simplest, most effective form, using only one power element.

UNIT NUMBERS OF NO. 573 VALVE

Stock Items with Your "Detroit" Wholesaler
Use "Detroit" Unit Numbers when Ordering

Unit No.	Refrigerant	Max. Pressure	Connection
57300	Freon-12	45	Inlet ⅜" SAE for ⅜" x ½" reducing nut. Outlet ½" SAE for ½" x ⅝" reducing nut
57309	Freon-12	10	
57311	Methyl	35	
57315	Methyl	5	

Rated at ½ ton Freon-12 or .9 ton Methyl

DETROIT LUBRICATOR COMPANY

DETROIT

General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

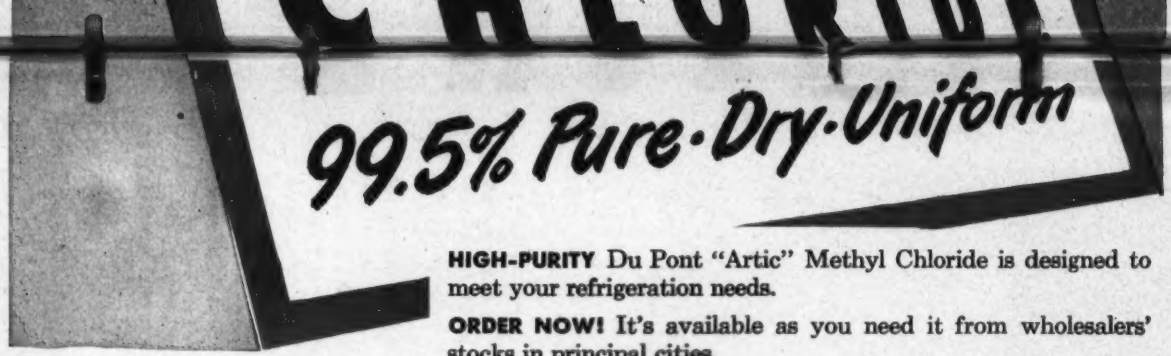
RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

For YOUR
Refrigeration Needs

Artic

DU PONT
METHYL
CHLORIDE



HIGH-PURITY Du Pont "Artic" Methyl Chloride is designed to meet your refrigeration needs.

ORDER NOW! It's available as you need it from wholesalers' stocks in principal cities.

EMPTY CYLINDERS NEEDED—Return them promptly to assure rapid deliveries.

For technical information, write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

DISTRICT SALES OFFICES: ***Electrochemicals Dept.*** Baltimore, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, El Monte, New York, Philadelphia, Pittsburgh, San Francisco; ***Ammonia Dept.:*** Offices in New York, Philadelphia, Chicago, St. Louis.

DU PONT METHYL CHLORIDE SPECIFICATIONS

Purity	99.5% Methyl Chloride
Moisture	0.008% by wgt. max.
Acid as (HCl)	0.001% by wgt. max.
Residue on Evaporation	0.01% by wgt. max.
Boiling Range (760mm)	—24.6° to—23.6°C.
Color	water white, clear

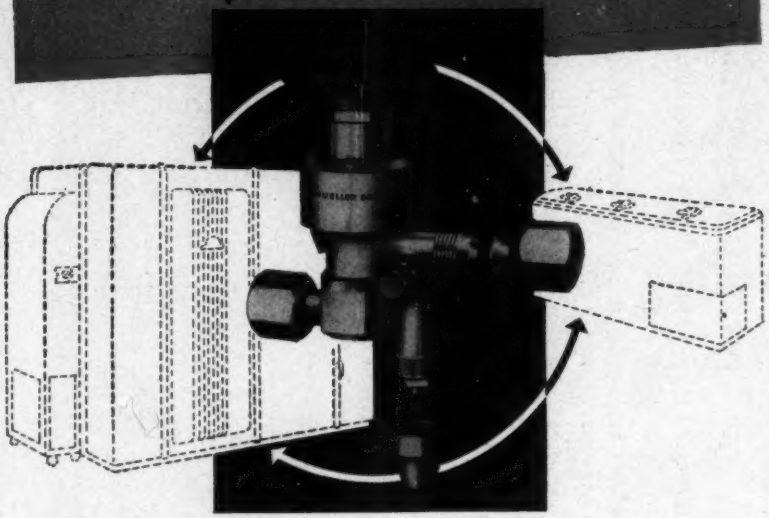
DU PONT ELECTROCHEMICALS

DU PONT

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

MUELLER BRASS CO.

Two-Temperature Control Valve



The Mueller Brass Co. Two-Temperature Control Valve is used in a refrigerating system where one compressor cools more than one unit and where it is desirable to more accurately control temperatures in the various units. It closely maintains a pressure in the coil at a level above the operating pressure of the machine.

An exclusive feature of this valve is the provision for by-passing the automatic valve in case it is desired to pump all the refrigerant from the coil. By means of this by-pass arrangement, the automatic valve can in effect be cut out of the system and the coil opened directly to the suction line. Provision is also made for the attachment of a pressure gauge while the line is under pressure.

There is no limit to the number of valves that can be installed on one system. When several boxes are to be maintained at different temperatures, the Two-Temperature Valves are installed on the higher temperature units.

An oval handle, which is independent of the automatic closing feature, provides manual closing and eliminates the use of a separate line valve.

Valves are furnished ½" and ⅝" flare.

MUELLER BRASS CO.

PORT HURON MICHIGAN

HERE IT IS!

the New SPORLAN *Catch-All* FILTER DEHYDRATOR

THE MOST PERFECT FILTER-DEHYDRATOR EVER DEVELOPED

SPORLAN

COMPLETELY DIFFERENT IN DESIGN!

- The unique construction of the Sporlan Catch-All provides effective moisture and dirt elimination in refrigeration systems.
- The drying agent of the Sporlan Catch-All unlike other drying agents is a *moulded porous cylinder* which *both* dehydrates and filters . . .

IT CANNOT POWDER! • IT CANNOT PACK!

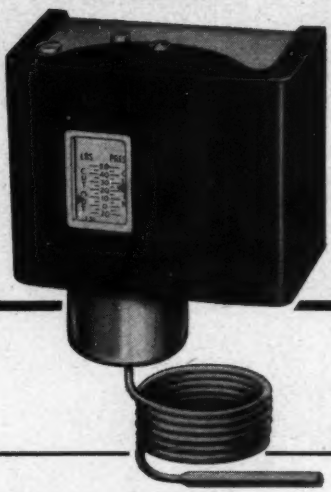
For
Peak Performance
on all installations
install a Sporlan
Catch-All
and take advantage of these extra features

- The Sporlan Catch-All will reduce the moisture content in an average installation with Freon, Methyl Chloride or Sulfur Dioxide refrigerant to at least 40% below accepted commercial standards!
- The Sporlan Catch-All will catch all scale, solder particles, carbon, sludge, dirt or any other foreign matter *as minute as 9 microns* with negligible pressure drop!

Two Switches in One!

That's What This New 2-Pole Control Gives You!

Series 270 and 272 PENN "Single" temperature or low side pressure controls. Also (not shown) Series 271 and 273 PENN "Dual" Controls which combine in one unit a temperature or low side pressure actuated mechanism and built-in high-pressure safety cut-out.

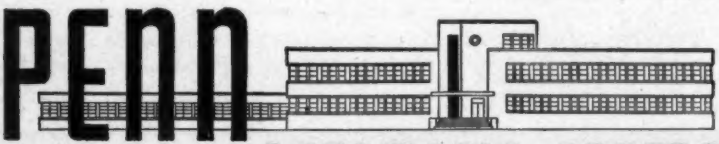


Refrigeration men have been waiting for this control a long time . . . the first and only one in the field to incorporate a load-carrying, 2-pole switch. This new PENN 270 Series Control *really gives you two switches in one.* It enables you to control polyphase motors of 3 H.P. and under (where protection against single phasing is provided) without line starters. It can control multiple refrigeration systems. It can control two separate load circuits. And when wired in single phase circuits as a 2-pole switch, it always breaks the "hot" line.

Write for full details on this revolutionary control today. No other control assures so much versatility, simplicity, efficiency and dependability. *Penn Electric Switch Co.*, Goshen, Ind. Export Division: 13 E. 40th St., New York 16, U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ont.

8 Star Features 8

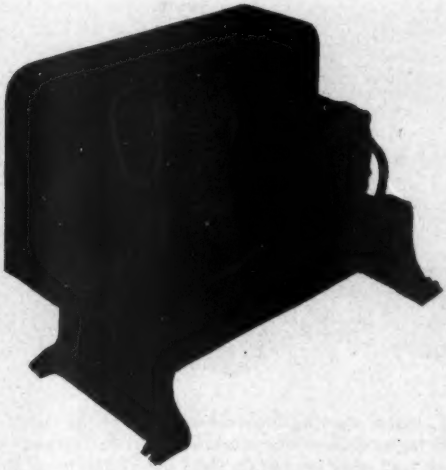
- ★ *Double-pole construction provides versatility of application . . . and gives greater protection*
- ★ *Direct-reading, visible, calibrated scale shows operating cut-in and cut-out points . . . simple adjustments. "Dual" Controls have visible calibrated scale showing high-pressure cut-out point.*
- ★ *Calibration or accuracy of performance not affected by vibration or mounting position.*
- ★ *Full range of differential adjustment in one model.*
- ★ *Two temperature ranges cover all requirements.*
- ★ *Sturdy contact mechanism with better electrical performance.*
- ★ *Large block assembly with terminals molded internally for strength and permanency.*
- ★ *Modern, attractive, high tensile strength plastic cover.*



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

Your friendship is our most valued asset.
Every Mills Condensing Unit is designed
and built to hold that asset carefully in trust.



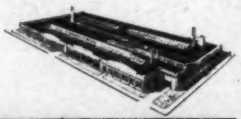
Mills Industries, Incorporated
Refrigeration Division
4100 Fullerton Avenue - Chicago 39, Illinois

Capacitron A.C. motor starting replacements are of the same type and quality as supplied to leading motor manufacturers for original equipment. Designed for quick and easy mounting, they are ruggedly built to the highest electrical and mechanical standards. 95% of all service jobs can be serviced with a comparatively small stock. Because Capacitrons are hermetically sealed in time-tested metal cases, there can be no leakage or breakage problems. And, best of all, Capacitrons cost you no more. If you want to consistently turn out profitable, trouble-free capacitor replacement jobs—insist on Capacitrons. Your jobber will help you get started.

The CAPACITRON Company

849 N. KEDZIE AVENUE CHICAGO 51, ILLINOIS

TELEPHONE VAN Buren 3322

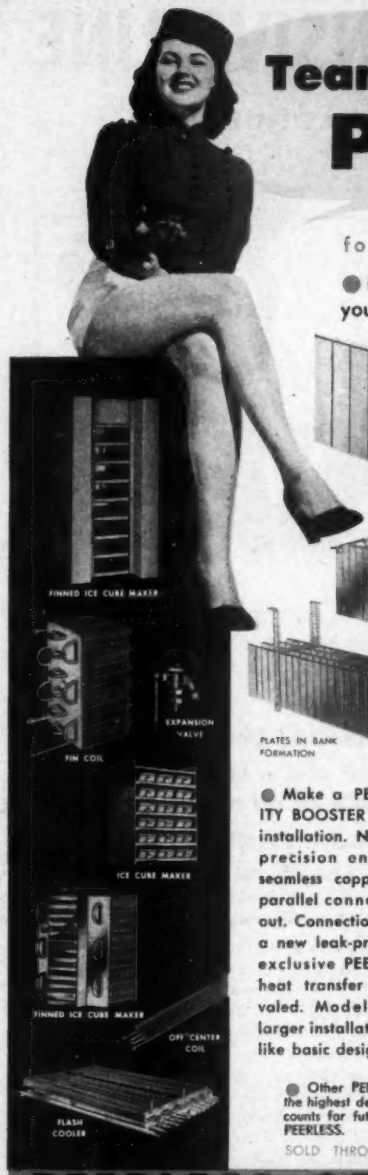


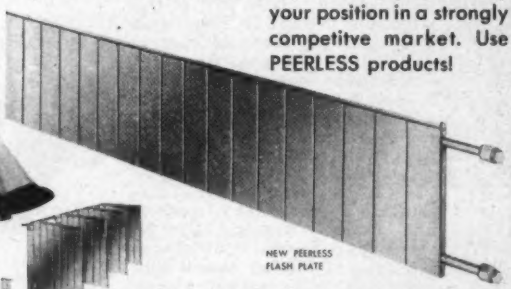
AVAILABLE SOON THROUGH YOUR LOCAL JOBBER

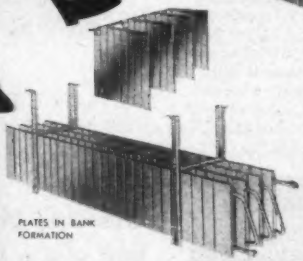
Team up with . . .
PEERLESS

for efficient installations and profits

● PEERLESS is ready with a helping hand to give your installations efficiency—the way to fortify your position in a strongly competitve market. Use PEERLESS products!

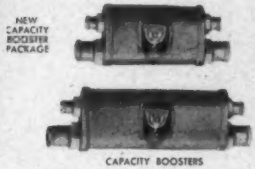






● PEERLESS FLASH PLATES are available NOW in QUANTITY for all low temperature applications such as locker plants, fixtures, domestic and commercial quick freezers, etc. Flat aluminum plates are mechanically bonded together by continuous copper or aluminum tubing. No joints — No leaks. Fast action! Low operating costs!

● Make a PEERLESS CAPACITY BOOSTER a part of every installation. New Model AA is precision engineered from seamless copper tubing with parallel connections throughout. Connections are brazed by a new leak-proof process. The exclusive PEERLESS THERMEK heat transfer surface is unrivaled. Models B and C, for larger installations, incorporate like basic design.



● Other PEERLESS products, illustrated at left, are designed to provide the highest degree of efficiency. The satisfaction your customers get NOW counts for future sales and profits — a solid reason for teaming up with PEERLESS.

SOLD THROUGH LEADING REFRIGERATION SUPPLY WHOLESALERS

PEERLESS OF AMERICA, Inc.

General Sales Offices . . . 2901 Lawrence Ave., Chicago 25, Illinois

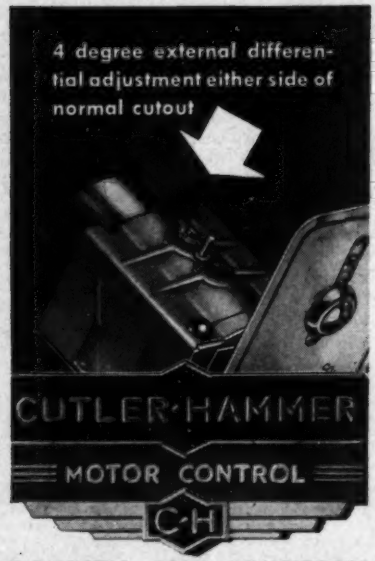
A COMPREHENSIVE LINE

Cutler-Hammer Refrigeration Replacement Control

The Cutler-Hammer line of Refrigeration Replacement Control is unusually comprehensive and complete. One unit alone, the *Universal* unit, will handle 60% of the repairman's needs. In rare cases where exact replacement control must be furnished, that item also will be found in the Cutler-Hammer line, individually packed, clearly labelled, complete with dial plate, mounting screws, trim washers and instructions for mounting, and range and differential adjustments.

The Cutler-Hammer Line of Refrigeration Replacement Controls is the product of more than 50 years of fundamental control specialization . . . another reason why outstanding refrigeration wholesalers recommend it and alert service organizations from coast to coast feature and use it. . . .

CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wis.



This One Universal unit alone covers 60% of all needs.

Bul. 9521N9

Adjustable Mounting Brackets
Maximum Mounting Centers 4-3/16
Minimum Mounting Centers 2-3/16

Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "HI" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers settings and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of single dial replacement jobs where overload is not required in unit.

DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL

For Efficient Refrigeration Use Proved and Improved Controls

Here is efficient, unsurpassed refrigeration equipment. Specifically designed for the control of Freon, Sulphur-dioxide, Methyl-chloride and Ammonia. Also air, water, gas, light oil, etc. Suction lines or hi-pressure liquid lines.

K-15 and K-20 Series. Magnetic liquid and suction stops. The direct acting single seated needle valves and the piloted piston valves respectively. All valves are held open electrically, thus eliminating unnecessary compressor burdens. Tight shut-off for fractional tonnage installations. Features are Die-forged bodies, Hardened steel needles, Corrosion-proof internal parts, Gasketless construction, Integral mounting features, Moisture-proof high pressures. Single or dual voltage coils.

V-200 Thermal Expansion valve. Interchangeable Orifice Cartridges permit proper sizing on the job, making this literally six valves in one. Unmatched sensitivity, semi-liquid charged; may be placed in ambient temperatures higher or lower than bulb temperatures with no loss of control. Frictionless pusher-pin, ample diaphragm, plus balanced, low-rate adjusting spring. Carefully lapped hard-faced ball insures tight shut-off.

Strainers S-5 Series. The importance of suitable strainers ahead of a flow control device, such as automatic or regulating valves of any kind for long operating life, cannot be too heavily stressed. Bronze, iron or semi-steel bodies, Monel, reinforced bronze or felt screens, 3/16 to 120 strainer meshes.

For complete *specifications on these and other refrigerant controls in the broad General Controls line, write for the new 1946 Catalog 52C. Send request to your nearest Factory Branch, Distributor or Refrigeration Supply House.*

K-15

K-20

V-200

S-5-2

S-5-3

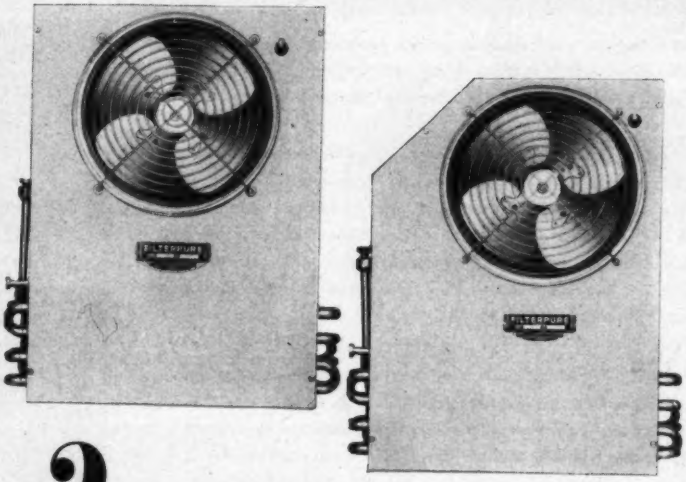
GENERAL CONTROLS

GC

3141

Filterpure

FOR DRY BEVERAGE BOXES



2 MODELS

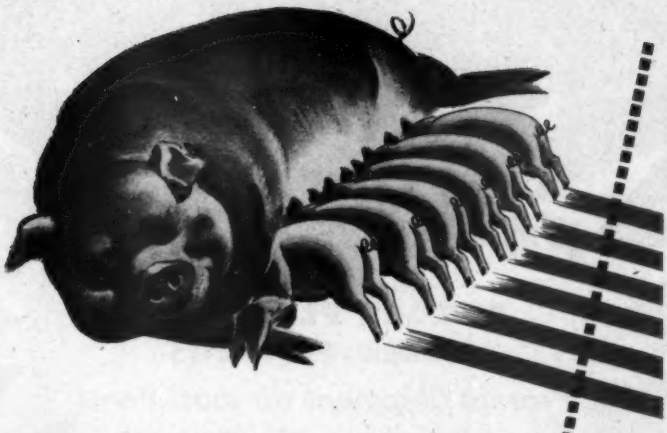
--for installation in extreme end of the fixture
--or for installation on center of rear wall

3 SIZES

--to balance ¼ - ⅓ - ½ HP compressor.

Sold by Leading Refrigeration Wholesalers

BETZ CORPORATION
HAMMOND, INDIANA



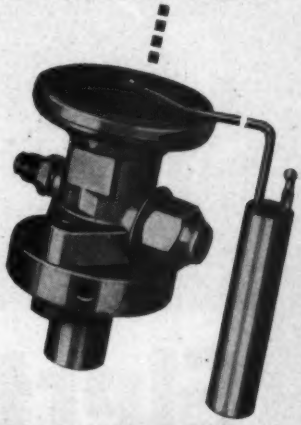
EVEN DISTRIBUTION...NO "STARVING"

WITH THE ALCO MULTI-OUTLET THERMO VALVE

Every circuit is fed its full share of refrigerant – the entire coil works at peak efficiency because the ALCO Multi-Outlet Thermo Valve assures:

- The refrigerant liquid is accurately metered at the point of expansion to all coil circuits
- Even distribution regardless of load changes – no "flooding" or short-circuiting
- No separation of gas and liquid before distribution
- Higher operating suction pressure – accurate control – no "hunting" or "cycling"

Result: less running time – lower operating cost. Available at your wholesaler's for all refrigerants and applications: ½ to 50 tons FREON-12, 2 to 36 outlets. Ask for our Bulletin 180.



ALCO

ALCO VALVE CO.

857 KINGSLAND AVE. • ST. LOUIS 5, MO.

Designers and Manufacturers of Thermostatic Expansion Valves; Pressure Regulating Valves; Solenoid Valves; Float Valves; Float Switches.

ENGINEERED
to fit..
FORGED FLARE NUTS
AND FITTINGS
Prompt Shipment on most items
Electrimatic
2100 INDIANA AVE CHICAGO 16 ILLINOIS

REFRIGERATION
SUPPLY DEPOT
YOU'RE
Just around the Corner
FROM A
Kelvinator
REFRIGERATION PARTS
AND SUPPLIES DEPOT
There's a solution to your supply problem in Kelvinator's network of 50 depots, conveniently located throughout the country and carrying a *complete* line of refrigeration parts and supplies.
Stop by for over-the-counter service, or mail your order direct to the Kelvinator depot in your vicinity. Either way, it's quick service to you on the part you need—*when* you need it, and competitively priced.
Kelvinator
DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT
CONDENSING UNITS
REFRIGERATION PARTS AND SUPPLIES
BUY KELVINATOR FOR ALL YOUR REFRIGERATION REQUIREMENTS

DETROIT PUBLIC LIBRARY

WANTED

NOW

Empty "FREON" Cylinders

Users of "Freon" Safe Refrigerants are urgently requested to check all "Freon" cylinders on hand and to return empty cylinders at once—today, if possible!

Empties are badly needed to meet the greatly increased demand for "Freon."

Shortage of cylinders in which to ship "Freon" has resulted from reduced deliveries of new cylinders...due to scarcity of raw materials, chiefly steel. One way to bridge the emergency . . . continue meeting the tremendous demand for "Freon"... is to utilize every available "Freon" cylinder. So won't you *please* check all cylinders you have on hand and return the empties NOW.

KINETIC

FREON

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safe refrigerants

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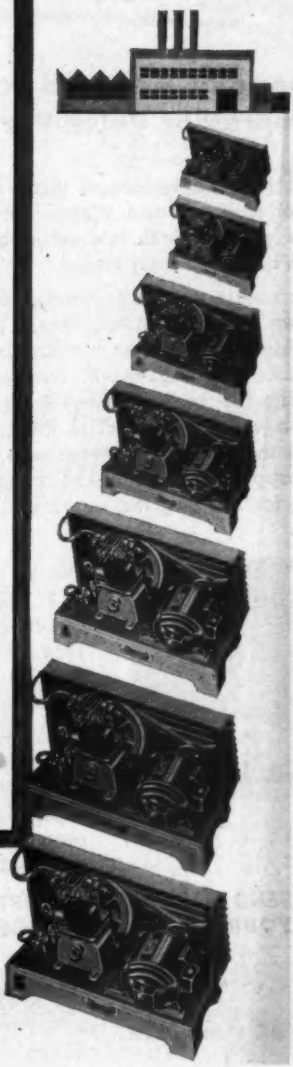

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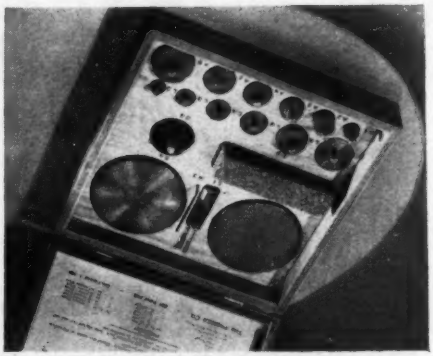

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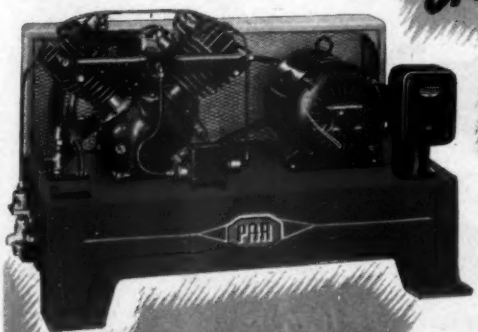

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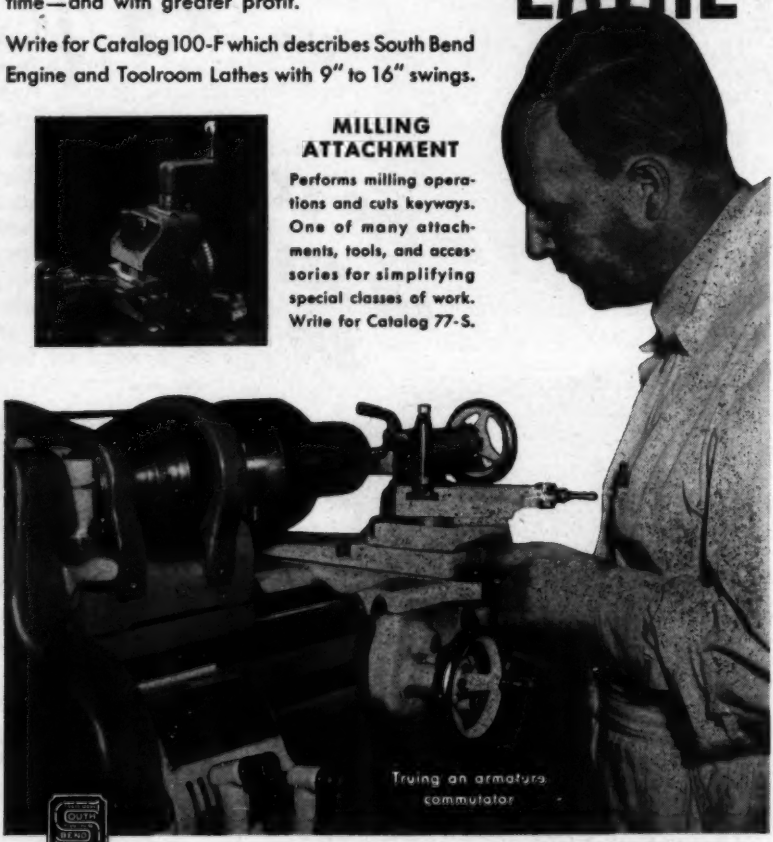

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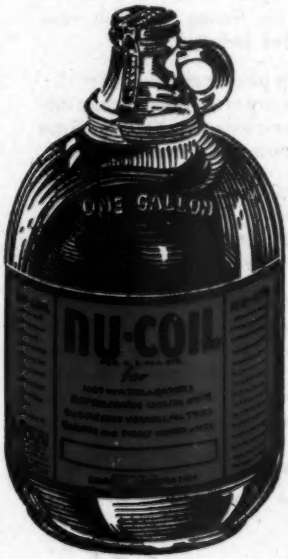

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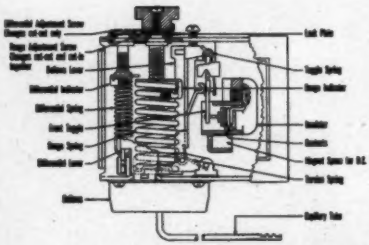

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Contents

In This Issue....27

Refrigerant Control for Low Temperature Systems —*by F. Y. Carter*....29

Construction, Operation and Servicing Coldspot Home and Farm Freezers....32

Charging and Starting Air Conditioning Systems —*by J. N. Calhoun and F. M. Mayse*....35

It is Less Hazardous to Raise Prices Than to Cut Prices —*by W. F. Schaphorst*....39

Getting Down to Business—*by Waylan Clarke*....40

Service Pointers:
- Capillary Tubes Cause Noise....42
- Detecting Excess Oil....42
- Locating Leaks....43
- Flare Caps....43

Questions and Answers:
- Comments on Questions....44
- Meat Dries Out and Compressor Sticks....45

You Want "Freon" and Methyl?—Then You Can Help....46

Bringing Home the Bacon—Fresh Frozen....47

The Importance of Recording Serial Numbers....50

Guild Adopts Code of Ethics....52

New Hermetic Analyzer....54

RSES News and Activities:
- Coming Conventions....56
- Alabama State Assn. Holds 3rd Convention....56
- Canadian Meeting in March....60
- New Chapters in the Making....60
- Chapter Notes....60
- New England States Meeting....62
- Canadian Capitol Chapter Dinner Meeting....64
- Columbus Chapter Christmas Party....66
- Ladies Auxiliary....68
- Film Schedule....70

New and Improved Equipment....76

News of the Equipment Industry....82

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IN THIS ISSUE

If you were one of the few who, during the war, had the experience of installing very low temperature systems, you will know how difficult it was to make the conventional type thermostatic expansion valve work, and how hard it was to get the system started after a shut-down. There were definite reasons for this difficulty which could not be overcome without the introduction of some new ideas. In his article "Refrigerant Control for Low Temperature Systems" on page 29, F. Y. Carter, the author, discusses the difficulties encountered, the reasons for them. The article will be continued next month and at that time he will discuss one remedy for the trouble.

The second article in the series on "Construction, Operation and Servicing Coldspot Home and Farm Freezers" appears on page 32. It contains a description of the hermetically sealed capillary tube system used in the six cubic foot model, among other things.

The concluding article entitled "Charging and Starting Air Conditioning Systems," by J. N. Calhoun and F. M. Mayse, appears on page 35.

"It is less hazardous to raise prices than to cut prices" is an interesting statement and the title of an article by W. F. Schaphorst, appearing on page 39. For a mathematical lesson in business management read this article.

The column of the inimitable Waylan Clarke, "Getting Down to Business," appears on page 40. In his column this month the author discusses that hard-to-write piece of advertising copy, the circular letter.

One of the service pointers appearing in the department on page 42 of this issue describes a new method of locating refrigerant leaks. It sounds good.

About one-half of the Questions and Answers department this month, appearing on page 44, is devoted to the comments of readers on past questions. The editor of the section appreciates this display of interest in the department and the opinions of others on the problems of readers.

"The importance of recording serial numbers" on all components of a refrigerating system is pointed out in an article appearing on page 50. It also includes a suggested form for recording this information.

* * *

COVER

PUTTING laboratory testing on a production basis is a task recently achieved by the Ben-Hur Mfg. Co., Milwaukee, Wisconsin manufacturers of Ben-Hur farm and home freezers. Rigid standards of performance set up early in the development of the Ben-Hur freezer, according to Mr. Herman Uihlein, president, made ordinary testing methods inadequate, for both management and the engineering division insisted that a complete record of the efficiency of every freezer be made so that the operation of every unit measured up to these high standards before leaving the plant.

Today, Ben-Hur farm and home freezers move from final assembly along one of many conveyor platforms into a huge "testing laboratory" equipped with the latest of testing and recording equipment. Each is connected to its own recording instruments and put through every type of operating test under the watchful eyes of engineers. Any necessary minor adjustments are made, while cabinet temperatures are recorded with room temperatures varying to the extremes possible in actual home use. The huge testing rooms are capable of simulating every possible operating condition, both as to temperature variation and humidity.

Each cabinet spends approximately 18 hours undergoing this rigid laboratory test routine. The front cover shows only a portion of the large test laboratory.

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Refrigerant Control for Low Temperature Systems

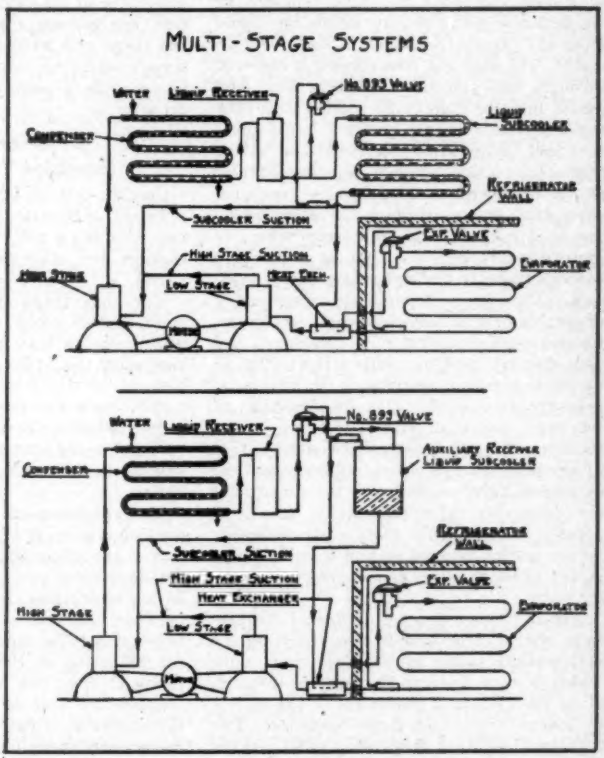
By F. Y. CARTER*

LOW TEMPERATURE refrigeration in the modern day usage refers to temperatures below —40° F. and ranging down to —125° or lower. This new field of refrigeration played a predominant part in aircraft development and usage during the war and will continue to make possible large scale research to insure our maintaining our position of leadership. As manufacturing processes improve, low temperature refrigeration is expected to play an increasingly larger part in civilian production. Already it is being used extensively in the cold stabilization of metals, maintaining ductility in aluminum plates and rivets, shrink fits, and in vacuum dehydration processes.

Types of Systems

Two general systems, the multi-stage and the cascade, are in use, with the multi-stage system being subdivided into two classes.

Fig. 1 shows a multi-stage system where a liquid sub-cooler is employed to sub-cool the liquid. The sub-cooled liquid leaving the sub-cooler passes through the main suction line heat exchanger and is finally delivered to the expansion valve at a temperature approximating —40° F. and under normal head pressure. The temperature of the liquid leaving the liquid sub-cooler will vary during a pull-down, inasmuch as the saturation temperature of the sub-cooler depends on the intermediate pressure between the two stages of the condensing unit. This type of multi-stage system lends itself to applications where pressure type distributors are to be used with multiple pass evaporators.



FIGS. 1 AND 2.

*Detroit Lubricator Company. Paper presented before the RSES Illinois State Assn. annual meeting in Chicago.

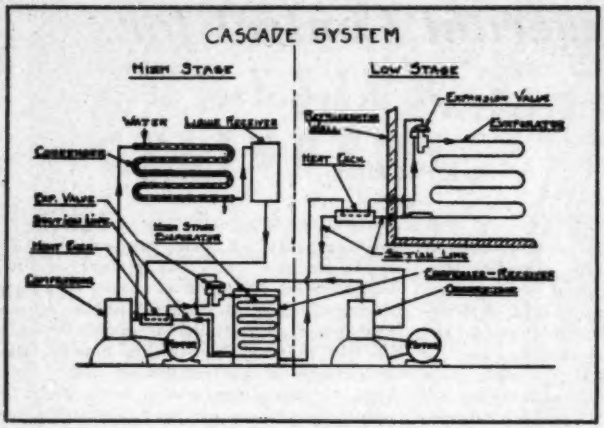


FIG. 3.

Fig. 2 shows a multi-stage system where the liquid sub-cooler has been replaced by an auxiliary receiver into which the liquid from the "liquid receiver" is expanded directly. The flash gas thus formed is removed through the sub-cooler suction line and passes into the high stage suction line. The liquid in the auxiliary receiver has a pressure and temperature corresponding to the high stage suction pressure and consequently the liquid which is delivered to the expansion valve after passing through the main suction line heat exchanger is at a temperature of approximately —40° F. but at a pressure corresponding to the high stage suction pressure. This type of multi-stage system is adaptable to applications where a single continuous tube evaporator is employed, and can also be used in conjunction with an overflow type of distributor in which no pressure drop exists. One disadvantage of this type of system when employing an expansion valve as a refrigerant control is that a very small pressure drop occurs across the expansion valve orifice, with the result that the expansion valve capacity is decreased greatly. Consequently when using expansion valves on this type of system it will be necessary to select valves using corrected capacity data.

Fig. 3 shows a general outline of the cascade system. The heat is removed from the refrigerated space by the low stage unit, which in turn delivers this heat to the high stage unit, where it passes out of the system by means of the high stage condenser. The high and low stage condensing units may be charged with the same refrigerant or different refrigerants, but it is to be noted that they are each a complete and separate refrigerating system. The high stage condensing unit must be large enough to remove heat from the condenser-receiver at a rate fast enough to cool the liquid in the low-stage receiver to a saturation temperature of —20° F. to —30° F., thereby greatly increasing the capacity of the unit. Thus it is readily seen that in effect the cascade system gives the same results as the multi-stage system. An advantage of the cascade system, however, is that refrigerants may be selected for the low stage unit which will allow smaller low stage condensing units to be used than would be found in a multi-stage unit of the same capacity.

Conditions Affecting Expansion Valve Selection

Cascade systems involving as many as four different refrigerants are in use and this necessitates a great variety of power element charges for otherwise standard expansion valves.

The multi-stage system using the intermediate flash cooler and the cascade system offer such low inlet pressures to the expansion valve that it becomes necessary to compensate for the loss of pressure head. Actually, since the flow through an orifice is proportional to the square root of the pressure difference across the orifice, much larger valves must be selected for these applications.

The operation of so-called standard expansion valves is hindered by the lack of power at extremely low temperatures. The standard valve must be charged with a fluid having approximately the same pressure temperature characteristics as the refrigerant on which it is to be used. As the valve depends for its action on change of pressure in the power element due to change of feeler bulb temperature and as the pressure temperature curve is so flat at the low temperature encountered, very little operating power can be developed by the standard expansion

valve. The available power, however, can be efficiently utilized by proper valve selection. In general, expansion valves for single stage systems should have capacities in tons equal to the motor horsepowers. The only safe selection of valves for multi-stage or cascade systems can be made from the valve manufacturers' rating tables.

In low temperature work the split between cabinet temperature and refrigerant suction temperature becomes quite low at the lowest cabinet temperature, and under this condition a considerable part of the evaporator is required to pick up even one degree of superheat. This makes it imperative that a refrigerant control valve have either a constant superheat curve or one that falls off as the suction temperature becomes lower. This desirable type of superheat control has been mechanically designed into the two bellows expansion valve, this type of valve normally being charged with the same refrigerant on which it is to be used. The power element bellows is slightly smaller in area than the body or pressure bellows, the difference in areas being such that once the superheat is adjusted for 10° F. it will remain 10° F. or less regardless of the suction temperature. This same desirable type of superheat control can be obtained by cross charging the single diaphragm expansion valve.

The wide range of temperatures on some applications such as altitude test chambers results in the capacity demand varying from a few hundred Btu's to several thousand Btu's. Designing or selecting a single expansion valve to cover this range of operation is quite a problem. As a result the use of multiple valve set-ups is not uncommon.

Capacity a Function of Needle Opening

The capacity of an expansion valve depends on a number of factors, among them (1) the pressure drop across the orifice, (2) the inlet liquid temperature, (3) the suction temperature, and (4) the orifice area or its equivalent needle opening. For practical purposes if all other factors are held constant, it may be said that the capacity varies directly with the valve needle opening, this being true within the limits of movement ordinarily used.

The needle opening and the capacity of the expansion valve are definitely related to the valve superheat setting. Refer to Fig. 4.

A plot of the needle openings versus feeler bulb temperature increase will show that the needle opens an approximately constant amount for each degree F. increase in feeler bulb temperature at constant pressure.

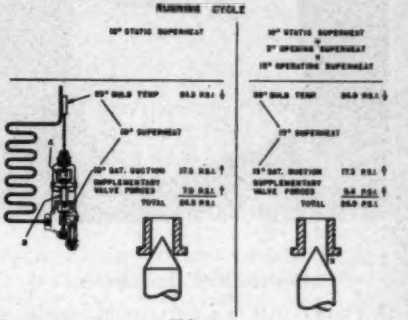


FIG. 4.

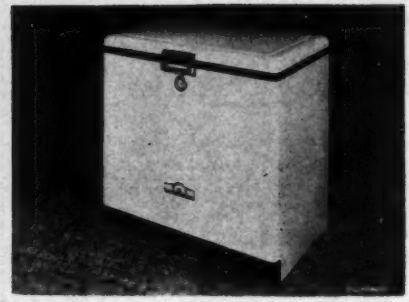
The increase in feeler bulb superheat over and above the "static superheat" setting is called the "opening superheat." Thus the capacity of a thermostatic expansion valve is directly related to the "opening superheat." The sum of the "static" and "opening" superheats is referred to as the "operating superheat," because the valve will actually operate at this value of superheat.

The Effect of Superheat Change

The movement of the needle is the result of a change in pressure in either or both of the power elements. If the same needle opening is required at different operating conditions, the same pressure change or changes must be developed within the power elements. The change in temperature necessary to give a constant pressure change will vary with the suction temperature, and will vitally affect the rating as well as the performance of the thermostatic expansion valve. The characteristic curve of Freon-12 will show that a 3° F. change in temperature will result in a 3 lb. per sq. in. change in pressure at 40° F., while a 33° F. change in temperature will be required to result in the same 3 lb. per sq. in. change in pressure at —100° F. Practically, this means that the capacity of a standard expansion valve at —100° F. suction is approximately only 1/15 the capacity at 40° at the same superheat.

All of the above applies to the standard thermostatic expansion valve equipped with a single charged power element and using the system suction pressure acting on the pressure element as a motive force to help bring the valve forces into balance.

(To be Continued)



Construction, Operation

Coldspot Home

Moisture and Dehydration

MOISTURE in a refrigerating system is the greatest source of trouble. Moisture combines with sulphur dioxide to form sulphurous and sulphuric acid, and with methyl chloride and "Freon" to form hydrochloric and hydrofluoric acids. These acids attack iron, copper, and brass parts which results in corrosion causing compressor "freeze-ups," leaky valves, loose bearings, copper-plating, and formation of sludge in the oil, which clogs strainers and orifices, gums up valves, and coats condenser and evaporator surfaces reducing their capacity. An excess of moisture will also form ice in expansion valves, float valves, and capillary tubes, stopping the flow of refrigerant.

The amount of moisture which a system may contain without damaging effects is infinitesimal. As little as 300 parts of water per million parts of "Freon" and methyl chloride will form corrosion. While as little as 60 parts per million (.006 of 1% by weight) will not cause ice to form in methyl chloride above minus 58° F., the same amount in "Freon-12" will cause a freeze-up at plus 32° F. Therefore, in the freezers, the moisture content of "Freon" must be kept much lower than for sulphur dioxide or methyl chloride. "Freon," as received from the manufacturer, may contain as much as 25 parts per million. The factories reduce this to 10 or 12 parts per million before using it. They also go to great trouble to keep moisture out of the oil, and to dehydrate the refrigerating unit and system properly. In serving "Freon" systems, extreme care must be taken by the serviceman to keep his "Freon," oil, tubing, gauges, fittings, and parts clean and dry. He must follow the procedure outlined in the following pages to prevent air and moisture from entering the system when opened for service.

Driers

As added insurance against the effects of moisture in the system, dehydrator or driers have come into general use. Silica Gel is generally accepted as the best and easiest to handle, although activated alumina, calcium sulphate, and calcium chloride are common. The Gel is granular, like white sand, and to be effective in the drier, must be processed to a high degree of dryness. Should the caps on a drier be loose or removed, and the drier exposed to the atmosphere longer than necessary to install, it will take up moisture and instead of drying out the system, it may actually add moisture to the system. Never use a drier unless it is absolutely certain the seal on the ends has not been broken.

Driers will take up and hold more moisture at low temperatures than at high temperatures. For instance, if a system is opened and worked upon, and proper precautions are not taken to keep moisture out of the system, and a new drier is not installed, the old drier may be near saturation. If the room temperature is cool, 60° to 70°, when the work is done, the system may work all right. However, when the room warms up to 90° or 100°, the capacity of the drier to hold moisture will be reduced, and the drier may release a slug of moisture which will cause a freeze-up. Due to early production problems, the first freezer will have driers located in the unit compartment in the liquid line. Later the driers will be located so as to be cooled by the evaporator.

40 gram Silica Gel driers are placed ahead of the capillary tube in the 6 cu. ft. model, and in the liquid line of the 9 cu. ft. 80 gram driers are used in the liquid line of the 12 and 18 cu. ft. models.

Capillary Tube System

The 6 cu. ft. Coldspot freezer is the first item by Sears to employ the capillary tube refrigerant control. The principle is old; and has been used on household refrigerators extensively.

It is a metering device, the amount of refrigerant passing through it depending on

and Servicing

and Farm Freezers

Second Article

This series of articles on the Cold-spot Freezer, taken by permission from the service manual issued by Sears Roebuck and Co. will describe in detail constructional features, operation data, test specifications and service information on the four models now being produced.

the head pressure, suction pressure, diameter of bore and length of tube. Unlike expansion valves and float valves, the capillary tube does not stop the flow of refrigerant on the "off" cycle. Therefore all the refrigerant, contained in the "high" side—that is, the pump discharge valve chamber, discharge line, condenser, connecting tubing, drier, and capillary tube—is discharged into the evaporator during the "off" cycle until the pressure is equalized on the "high" and "low" sides, or until the control starts the "on" cycle.

There is a slight loss of refrigeration during the "off" cycle due to the hot liquid and gas in the "high" side passing into the evaporator. In order to keep this loss to a minimum, the volume of the "high" side must be kept to a minimum. For this reason, the pump discharges directly into the discharge line, the condenser tubes are of small diameter and sometimes flattened, the drier is small, and there is no receiver. The suction gas is taken into the compressor housing where it helps to cool the motor and oil.

Since the refrigerant charge diffuses throughout the entire system on the "off" cycle, the pressure on the discharge side of the pump reduces to practically the same as the pressure on the suction side. Thus the motor is automatically unloaded at the start of the "on" cycle which permits the use of a split-phase motor without an unloading device. During normal operation the refrigerant is at low temperature and the maximum pressure at starting is about 10 psi. However, with the complete unit, cabinet and evaporator stabilized at 110° F., it might be expected that the saturation pressure of 136 psi. would prevail. Actually, the pressure on both "high" and "low" sides is less than 50 psi. This is due to the affinity of "Freon-12" for oil and the large amount of oil, 40 oz., charged into the compressor. Enough "Freon" dissolves in the oil to reduce the pressure from saturation to 48 psi. For this reason the unit will start in better than 110° F., with only an occasional tripping of the overload.

The schematic diagram, Fig. 7, represents the capillary tube system as applied to the 6 cu. ft. freezer, with the description given. The diagram is self-explanatory for normal operation but certain features should be noted:

Capillary Tube System

a. The system cannot be "pumped down." If the liquid valve is closed the condenser will fill up, the head pressure will become excessive, and the motor will stall. A frozen or clogged capillary tube would give the same results. Therefore, when repairs are made to the system, it must be completely recharged.

b. Except at the end of the "off" cycle, the "high" side gauge line will be filled with liquid. Therefore the "high" side gauge line should be as small and short as possible, and the gauge should never be installed or removed except at the end of the "off" cycle.

c. At the start of the "on" cycle, when practically all the refrigerant is in the evaporator the system has "flooded" characteristics. After a few minutes of operation, the system stabilizes, and refrigerant is fed to the evaporator as fast as it is pulled away. The system thus adjusts itself to whatever load is placed on it up to the capacity of the compressor.

d. There is nothing to adjust, the system either works or it doesn't. With so few moving parts to get out of order, it is only necessary that the system be tight, clean, and dry, and have the proper amount of charge.

e. With the proper charge the coil will be saturated up to the accumulator. The gas will then superheat up to and through the heat exchanger, reaching the compressor at very nearly room temperature. An overcharge would waste refrigeration and reduce the efficiency of the compressor while an undercharge would starve the tail end of the coil and might cause continuous running by failure to cool the control bulb low enough.

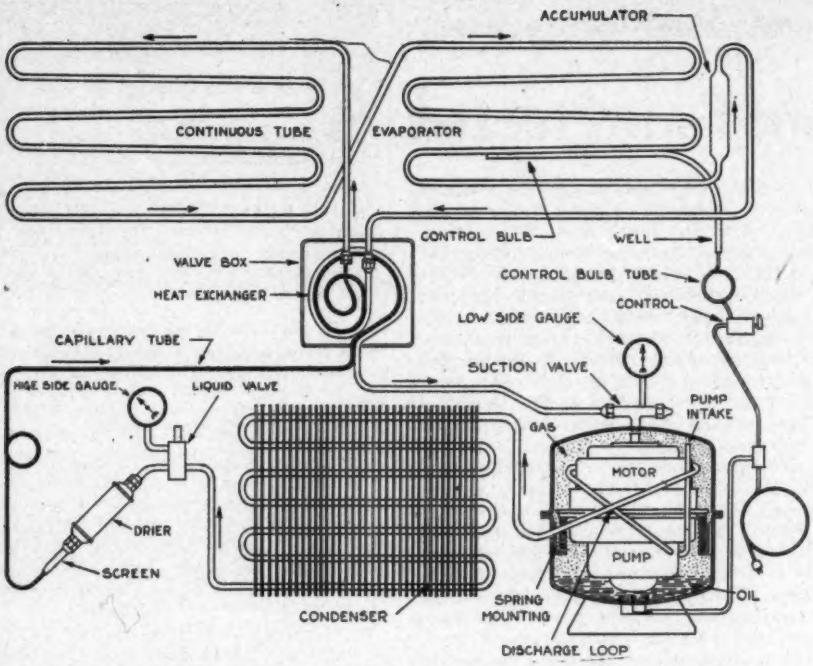


Fig. 7—The capillary tube system portrayed schematically as used in the 6 cu. ft. model.

To Remove the Door

The freezers will not go through a 30 inch doorway without removing the cabinet door including hinges and handle. They were designed this way intentionally in order to provide the maximum capacity in the minimum dimensions.

a. 6 cu. ft. only—Remove the fibre flue from the rear of the freezer.

b. Remove the wooden pin from the lock hole in the handle.

c. Raise the door until it stops (about 60°) to take the tension off the hinge springs.

d. With someone supporting the door, remove the 4 screws holding each hinge to the cabinet and remove the door with hinges and handle attached.

e. Remove the latch strike on the front of the cabinet. Before moving the freezer, remove the accessory parts packed inside.

To replace the door, reverse the above procedure except leave the hinge screws, 1 or 2 turns loose. Then with the door closed, but not latched, push down on the top of the door over each hinge and finish tightening the hinge screws. Next, adjust the strike to apply enough tension to compress the gasket about 1/16 inch about when the handle is latched.

Checking Door Seal

Use a .010 to .015 in. feeler gauge or piece of paper about the thickness of a U. S. Postal Card to check the gasket seal. Adjust the strike or hinges as explained previously.

Motor Protection

All motors have built-in protection against overloads. If the motor trips the overload frequently, look for:

a. Clogged condenser.

b. Restricted air circulation through unit.

c. Low voltage.

d. Clogged or frozen liquid line (6 cu. ft. only).

e. Excess refrigerant (9, 12 and 18 cu. ft. only).

f. Tight belt.

(To be Continued)

Charging and Starting Air Conditioning Systems

By JOEL N. CALHOUN and FLOYD M. MAYSE*

Second Article

The success or failure of the best air conditioning job will depend upon the proper charging and starting after repair or prolonged shutdown. Thus the service engineer may be responsible for the degree of satisfaction derived from the system. This article, the first part of which appeared in the December issue, sets forth a definite routine of procedure in charging and starting.

Evacuating the Refrigeration System

THE refrigeration system should next be evacuated as follows:

1. Connect the Freon drum as shown in Fig. 4, December issue.

2. Check to see that the auxiliary evacuation valve is open.

3. Check to see that the strainer valve is at the "mid" position.

4. Start the vacuum pump and open valves A, B and C and the hose clamp on the pump manometer.

5. Allow the pump to operate until the pressure in the system has been reduced sufficiently to read on the manometer scale. Close valve A, without stopping the pump, and observe the manometer. If the difference in height of the two mercury columns changes rapidly, a leak is indicated and must be eliminated before proceeding further.

6. Open valve A on the pump and continue evacuation of the system. The length of time required will vary greatly depending upon the size of the system.

7. When a pressure of 2 mm has been reached, and maintained for one hour, close valve A on the pump and observe the manometer for at least 5 minutes. If the difference in height of the two mercury columns changes to more than 6 mm in 5 minutes, all the air has not been removed and the evacuation must be continued.

8. Repeat the procedure outlined in Steps 6 and 7 until the difference in height of the two mercury columns does not exceed 6 mm over a period of at least 5 minutes with valve A of the pump closed. When this condition is attained, the system is evacuated.

9. Shut off valves A and B of the vacuum pump and stop the pump motor. (Be sure to close the valves before stopping the motor to prevent drawing oil from the pump into the manometer.)

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Charging and Starting the System

The refrigeration system may now be charged and started as follows:

1. Set all zone thermostats to lowest control point.

2. Energize control circuit only. Be sure main switch to compressor motor is open.

3. Start all fans and all water circulating pumps.

4. Open the suction and discharge valves to the "backseat" position and install gauges E and F. Close the main line dehydrator by-pass valve and the auxiliary evacuation valve. This provides for charging through the strainer valve gauge port. Close the receiver inlet and outlet valves to cut the liquid receiver out of the refrigerant circuit.

5. Record the weight of the Freon drum, open the Freon drum valve and allow the system to fill with Freon vapor until the pressure of the vapor in the system equalizes the pressure in the Freon drum. (This pressure will be between 60 and 85 pounds per square inch, depending upon the temperature of the Freon drum.)

6. Check the oil level by placing the eye on a level with the oil level sight glass in the crankcase of the machine. The proper oil level is such that oil can be seen to cover one-half of the sight glass. (On compressors not equipped with an oil level sight glass, other means are provided for determining adequacy of oil charge.)

7. As a preliminary check on the direction of rotation of the compressor motor, which should be as indicated by the arrow designating the proper rotation, instantaneously start and stop the compressor several times by closing and opening the main switch to the motor, and simultaneously observe the direction of rotation of the motor.

8. Close the auxiliary servicing valve. Arrange the Freon drum on the scale in such a way that the valve on the drum is lower than any other part of the drum. This will allow liquid Freon to be drawn into the system as the charging proceeds.

9. Start the compressor and turn the suction and discharge valves just enough to permit reading gauges E and F.

10. Upon starting the unit, immediately verify the oil pressure by reading the oil pressure gauge. Be sure that the gauge valve is open. The oil pressure (varies in different makes of compressors, but should always be above the suction pressure) should be a minimum of 20 pounds per square inch higher than the suction pressure of the system and should not fall below this figure.

Check Oil Pressure

11. If the oil pressure gauge does not read at least 20 pounds higher than the suction pressure, stop the unit and change the direction of rotation of the motor. (On some compressors the direction of rotation will not affect the performance of the oil pump as these units are supplied with a pump which operates equally well in either direction.) If necessary to change rotation, open the main switch supplying power to the linestarters and proceed as follows:

(a) On 3-phase electrical systems reverse any 2 of the 3 leads to the linestarter. On 2-phase, 3-wire systems do not disturb the common phase lead, but reverse the other 2 leads to the linestarter. On 2-phase, 4-wire systems reverse the 2 leads of either phase to the linestarter.

(b) Close the main switch, start the unit and recheck for proper rotation and verify the oil pressure.

12. When the oil pressure is satisfactory close the oil gauge valve.

13. Continue the charging operation as previously outlined.

14. If the compressor shuts down on low pressure during this part of the operation, depress the reset button on the Type A high-low pressure cutout or move the reset lever to the left on the Type B cutout or make comparable adjustment to other types of cutouts. This will cause the compressor to continue running.

15. If the compressor shuts down because of high pressure, recheck the functioning of the evaporative condenser components.

16. When changing a Freon drum to continue the charging operation, open the strainer valve to the "backseat" position, shut off the Freon drum valve, set the Freon drum upright and remove the charging tube from the drum. Attach a full drum of Freon to the charging tube. Loosen connection of the charging tube into the strainer valve. Open the Freon drum valve and allow a small quantity of Freon gas to escape through the loose connection at the strainer valve. Retighten the connection of the charging tube into the strainer valve while the Freon is escaping. Start the compressor if not running. Open the strainer valve to the "mid" position. Open the valve on the Freon drum.

Check Liquid Indicator

17. After a preliminary charge of approximately half the estimated requirements has been weighed into the system, add Freon in small quantities, checking the sufficiency of the charge between additions by shutting off the Freon drum valve and then opening the auxiliary servicing valve and observing the action of the Freon in the liquid flow indicator after conditions have stabilized. If the Freon appears misty or contains bubbles, additional charge is needed. Refrigerant cannot be added unless the auxiliary servicing valve is closed.

18. Continue charging as outlined in Step 17 above, until the Freon stream is solid. This will be indicated by apparent non-action in the liquid flow indicator because a solid stream of Freon is transparent and colorless.

19. When the stream is solid the charging is complete. Close the Freon drum valve.

20. Record, in the appropriate place, the total weight of Freon charged into the system. (If this weight is less than the safe pump down capacity of the liquid receiver the operation is complete. If the total weight of Freon charged into the system is

Job No..... Date .....

Design Engineer..... Readings Taken By .....

	Design Specification Data	Test 1	Test 2	Test 3	Test 4	Test 5
Suction Pressure, psi						
Discharge Pressure, psi						
Fan Speed, rpm						
Temperature of Air Entering Coil, °F						
Temperature of Air Leaving Coil, °F						
Temperature of Conditioned Space						
Dry Bulb, °F						
Wet Bulb, °F						
Relative Humidity, Percent						
Temperature of Outside Air						
Dry Bulb, °F						
Wet Bulb, °F						
Return Air Flow, cfm						
Outside Air Flow, cfm						
Supply Outlets:						
No. 1 — Air Flow, cfm						
No. 2 — Air Flow, cfm						
No. 3 — Air Flow, cfm						
No. 4 — Air Flow, cfm						
No. 5 — Air Flow, cfm						
No. 6 — Air Flow, cfm						
Total Supply Air Flow, cfm						

Fig. 6—Suggested Form for Recording Readings Taken in Balancing Air Handling System.

greater than the safe pump down capacity of the liquid receiver installed in the system, additional liquid receiver capacity should be provided in order that the system may be pumped down and the refrigerant stored in the liquid receivers. This feature is necessary to facilitate servicing of the refrigeration system.)

21. Check the operation of the high-low pressure cutout by first stopping the evaporative condenser fans and water pump, and noting at what head pressure the cutout stops the compressor. This noted pressure should be checked against the specified discharge pressure for the compressor installed in the system. The low pressure protection may be checked by gradual throttling of the suction valves and observing the pressure at which the cutout stops the compressor. If the high-low pressure cutout does not operate properly it should be adjusted or replaced.

22. Open the suction and discharge valves to the "backseat" position.

23. Verify that the Freon drum valve is closed, and the liquid receiver inlet and outlet valves closed.

24. Open the strainer valve to the "backseat" position.

25. Remove the charging line.

26. Remove the gauges and fittings, insert the plugs in the gauge ports, tighten valve stem packing glands, and securely fasten the bonnets, which should be fitted with gaskets, over the valve stems.

27. Make a final careful check for refrigerant leaks by going over all joints, fittings, and valves with the leak detector. An oil film around a joint indicates a leak and the leaky joint should be repaired even though the leak detector fails to pick up an indication of Freon.

28. After the hour meter indicates that the system has operated a minimum of 48 hours, or longer where the operating pressures are below normal or where there is a possibility of liquid water being present in the system: Stop the compressor; close the dehydrator inlet valve; turn the dehydrator outlet valve to its "backseat" position; close the two by-pass valves leading to and from the dehydrator; and open the main line dehydrator by-pass valve.

29. Connect a length of copper tubing between the gauge port on the dehydrator outlet valve and a Freon drum which is not filled to capacity. Place the drum on the scales, open the gauge port and the drum

valve and drain not less than 10 pounds of Freon from the dehydrator. (This is an imperative precaution on large dehydrators to prevent the tank from bursting as the liquid expands with a rise in temperature.)

30. Close the drum valve, "Backseat" the dehydrator outlet valve, remove the tubing, and install gauge port plug. Close the dehydrator outlet valve and remove the dehydrator.

31. Remove the hour meter from the electrical circuit.

Balancing the Air Handling System

After the refrigeration system is charged and started and has operated for a sufficient length of time for refrigerant pressures, air temperatures, and other conditions to stabilize, the air handling system should be balanced. The suggested form shown in Figure 6 has proved useful in recording and comparing the data obtained during the balancing operation. A study of the data as recorded will indicate whether or not the adjustments made are improving the balance. All information called for on the form should be obtained and recorded.

It should be remembered that when any part of an air handling system, such as a grille, is adjusted, the change will affect the flow of air throughout the entire system.

The design specifications and drawings for the system should be used as guides, but it should be borne in mind that the data shown are based upon estimates and will not necessarily exactly correspond with data obtained by actual measurements made on the job after installation.

The balancing should be done as follows:

1. Check the filters or electrostatic cleaner for dirt loading and clean, or replace filters, if necessary.

2. Install suction and discharge pressure gauges on the compressor.

3. Set each damper and adjustable grille to a tentative position, which should be estimated from individual air quantities shown on the design data for the respective damper or grille. The return air grille should be wide open, and the coil face and by-pass damper, if any, should be set so that all of the air passes through the coil.

4. If the refrigeration system and/or air handling fans were stopped in connection with Step 1 above, they should be restarted. The refrigeration system should again be allowed to stabilize.

5. Check the operating speed of each fan drive against the design speed, using a tachometer or revolution counter and stop watch. If necessary, adjust the variable pitch pulley to obtain design speed.

6. Take and record a set of readings of air flow through each outlet using an anemometer or velometer. This may be done as follows:

(a) Divide each grille into imaginary squares about 6 inches on each side.

(b) Take an anemometer reading in the center of each square for one minute.

(c) Determine the average air velocity in feet per minute through the grille by totaling the readings obtained above and dividing the total by the number of squares in the grille.

(d) Determine the face area of the grille in square feet by multiplying the width of the grille by its height. Correct for free area of grille in accordance with the grille manufacturers catalog.

(e) Determine the air flow in cubic feet per minute through the grille by multiplying the velocity obtained in Step (c) above, by the free area obtained in Step (d). (Field measurements of this type may be in error by as much as 20 percent and this factor should be taken into consideration when comparison is made with design data.)

Check Total Air Flow

7. Total the air flow measurements for supply outlets obtained under Step 6 above, and compare this total with the design figure. If the total air flow of all supply outlets does not equal or exceed the total design air flow, adjust the variable pitch pulley on the fan drive to increase the fan speed by 20 to 100 revolutions per minute depending upon fan size. Be careful not to overload the fan motor. If the total air flow exceeds the total design air flow by a considerable amount the fan speed should be increased.

8. Readjust the outside air damper if necessary, to obtain slightly more than the design outside air flow. (Determine the air flow as outlined in Step 6.)

9. Beginning with the supply outlet nearest the fan, readjust each supply grille to obtain slightly more air flow than called for for that particular grille by the design data. (Determine the air flow as outlined in Step 6.)

10. If design air flows have not been approximately met, the procedure outlined above should be repeated until such conditions obtain.

The complete air conditioning system should now be given a final check, samples

(Continued on page 74)

It Is Less Hazardous to Raise Prices Than Cut Prices

By W. F. SCHAPHORST, M.E.

SINCE the termination of the war more than a year ago most of us have been subjected to a number of surprises as well as disappointments as regards prices and business. Prices were higher during the war, many items were difficult and even impossible to procure, and, as every reader doubtless recalls, plans were made by the government bureaus and by nearly everybody else to do things "differently" than after World War No. I. In general the aims were: prices to be reduced; wages were to be increased; there was to be no inflation; everybody would live happily together in Wilkie's One World; and so on. In fact this writer was so certain that prices would be reduced that he wrote an article on "The High Cost of Cutting Prices."

But, we were fooled. Prices have *increased* instead of being reduced, and now a great many of our executives are wondering about the cost of raising prices in the event that volume drops due to higher prices. The writer has been asked, "How about it? Is it as hazardous to raise prices as it is to reduce prices?"

The answer is "No." It is not as hazardous to raise prices, initially, as it is to cut prices. Of course the writer is considering this from the selfish viewpoint of the average business man, and not from the patriotic national viewpoint. Raising prices *does* assist in promoting inflation, and as this writer sees it, labor is largely responsible for the present skyrocketing trend, aided by vote-seeking politicians. Executives and owners of businesses are just about helpless because their combined vote doesn't amount to much when compared with labor's vote.

But going back to the cost of raising prices, as was shown in the writer's above-mentioned article:

Cut in price of	Necessitates increase in volume of
5%	25%
10%	67%
12%	100%
15%	150%

The table shown is based on a normal profit of 33⅓%. It looks serious from the very beginning. Some readers have declared that the table is incorrect, but it isn't. Cut your prices a mere 10% and you will have to increase your volume 67% in order to "make up" the loss due to price cutting, provided your profit is 33⅓%.

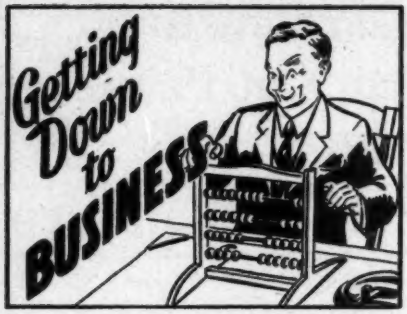
On the other hand, now, in the event that you lose volume for one reason or another to the extent of 10%, and your profit is 30%, it is necessary merely to raise your profit to 34% on the remaining 90% of volume in order to make up for the loss in volume. That amount of increase would scarcely be noticeable to your customers. Here is a table that tells the story, based on a normal profit of 30%:

For volume loss of	Profit, based on cost, must be
10%	34%
20%	40%
30%	49%
40%	62%
50%	85%
60%	136%
70%	333%

The above increases in profits, as will be noted, are not at all serious in the early stages of reduced volume. Thus, as already pointed out, where the reduced volume is 10% you merely step the profit up from 30% to 34%, which isn't much. If the reduced volume is even 20% you step up the profits from 30% to 40%, which isn't so bad either. But from there on conditions become worse rather rapidly. Thus if the volume is reduced 40% you must more than double your profits on your costs, and such an act would very likely be noticeable to your customers and might cause further falling off in volume.

In an effort to be of assistance so that any reader can do his own computing, here is a step-by-step method that you can readily apply to your own business. It is quite possible that your normal profit is not 30%.

(Continued on page 74)



BY WAYLAN CLARKE

OH MY! You could cut the gloom in your service shop with a knife. To think that you, an expert when it comes to wielding a flaring tool, or tearing down a unit and rebuilding it part for part, have to become a business man, too. To think that you, as the owner of your shop, have to do such mundane things as write a letter, for instance. But let's face it. Somewhere along the line you may have neglected your grammar (and you really shouldn't be blamed for it) and now the time has come to compose a piece of writing. That's the penalty you must pay for proprietorship — that's what you get for being independent, for being your own boss.

You see, you've come to the conclusion that a letter selling your service to local merchants would do you a lot of good, and now it's up to you to write it.

So here you are at your desk in the shop, chewing the end of your already ragged pencil, hoping that the 'phone will ring and call you out on an emergency service job. But no such luck, brother. You are about to become an author whether you like it or not, because you know that it's good business sense to plan some direct mail to all those lush potential commercial service jobs in your community.

Maybe one reason that your nerves and your pencil have both approached the ragged edge is due to the fact that you haven't an objective on which to work. You know only that it's good business to shoot out direct mail particularly just before and during the seasonal months and maybe you aren't even sure of this—except that some fool columnist in one of the trade papers you read made it sound pretty convincing that direct mail *is* good business.

All right! Put that pencil down, Mr. Service Shop Owner—you aren't ready to use it yet. Let's between us figure out what we are going after. You could make this first letter simply a get-acquainted proposition—to let the local merchants know that you ARE in business. On the other hand, maybe your advertising in the newspapers is taking care of that. Maybe your telephone directory listing is doing about the same. No, let's scratch around some more.

How about offering a special inducement to get these local merchants to drop into your store? Say you've picked up some interesting booklets from some manufacturer of refrigeration equipment and they give some excellent tips about food preservation. Suppose you shoot out a letter, tied in with newspaper advertising along the same line, that these booklets are free to anyone who comes into your shop to get acquainted? Not a bad idea—particularly if you have something to sell along with your service. But maybe there's a snappier idea.

How about offering a routine check-up or inspection service on a monthly basis? Say, here IS an idea! Possibly you can sign up some of these local merchants (real estate operators and multiple domestic installations included) on this kind of an offer. You might even offer an added inducement of a first inspection free of charge, provided, of course, that the merchant agrees to take on your service on a nominal monthly fee basis thereafter.

Fine! You have an objective that looks good. Here you can most likely get local merchants to develop the HABIT of coming to you when an emergency arises. Meanwhile, you continue your routine inspections each month on a nominal fee plan.

Yes, here's a deal that sounds solid—but you overlooked one detail—the one involving that chewed-off pencil you've been nursing. Now that you have your objective, authorship is calling. A good many ideas may be entering your consciousness by now, but translating them to words on paper is the next task.

Here's where you recall that "mumbo-jumbo" about getting attention, creating interest, developing desire, and urging action, about which that trade paper columnist wrote last issue. Well, roll up your sleeves!

Let's assume that you have a letterhead—one that tells your correspondent that (1) you have a name (2) you have an address (3) you do a certain kind of business.

Now we'll want a beginning. First for the salutation. You might use the formal salutation—the name and address of the

merchant followed by the customary "Dear Mr. Jones:" or you might subscribe to a "teaser" headline instead of the formal approach. Leading direct-mail authorities have proved that a catchy headline often outpulls a name. Let's try one. How about this?

"There's Rough Going Ahead for Your Refrigeration Equipment"

Then your opening paragraph can tie in with the headline and can begin to create interest by the tried and proved "appeal-to-the-pocketbook" method—like this:

The coming summer months will put a heavy load on your refrigeration equipment—and maybe a sizable dent in your pocketbook—IF you have to pay for costly emergency repairs and temporary loss of business due to interrupted service.

Then you can introduce your own plan for saving the merchant worries, perhaps like this:

You can be smart and save yourself money on the maintenance of your equipment by having an inspection made NOW of your cooling system. That's where we can do you a real service.

Here is the chance to point up your own qualifications:

As qualified service engineers, we are "trouble shooters" who can find an ailment quickly, locate a minor defect, and correct quickly at the least cost and inconvenience to you. Our monthly low-cost inspection plan throughout the summer can help you save money and catch the trouble before it gets serious.

Now you can clinch the point with an "urge-to-action"—

This is your chance to avoid costly repairs TOMORROW by calling on us TODAY to make that first all-important inspection of your equipment. Simply telephone BLANK 3333 and we'll be out there promptly!

Across the bottom of the letter, you might run additional selling copy—

Efficient Monthly Inspection Service by Expert Technicians

There you have the framework of a letter to grocers, butchers, druggists — all local merchants who are concerned with the keeping of perishable foods. The same theme can serve repeatedly by means of blotters, postcards, circulars, in a consistent direct-mail campaign. And you can offer the same proposition in a tie-in with your newspaper advertising.

But, now that we're on the subject of letter-writing, let's talk more generally about business letters. For you'll need to write all kinds of letters—correspondence with your suppliers, collection series, stocking of various items—not to mention the many varieties of promotional techniques you will employ.

You know, this matter of letter-writing worries a good many people. They believe that when they sit down to write any kind of a letter, they must turn out a literary masterpiece. They must drop completely out of character and become scholarly or legal.

Far too often I read stiff, formal letters coming from all sources—letters that are masterpieces all right, but masterpieces of vagary, of ten dollar words, of talking around a subject, of obscuring meanings with old, stale phrases and elegant Gay Nineties style.

Take for instance, "Yours of the 25thinst. received and contents noted." Oh, you'll find a good many letters starting out this way even today!

Is that the way you would talk to a fellow if you were meeting him instead of writing him? I should say not. You could put the story simply: "I have your letter of June 25."

Or take the formal, "We wish to state" Why "wish"? Simply go ahead and state! Then there is the "I will advise him accordingly." Look at that word "advise." It belongs to the legal profession—it's what you pay a lawyer for when you hire him. What you mean is "I will let him know" or "I will tell him."

Then there is the "I am desirous of" style. Why not say simply "I want." That's what you mean, isn't it?

There are hundreds of worn-out words and phrases like these that are used in correspondence today—words that slow up a

(Continued on page 74)

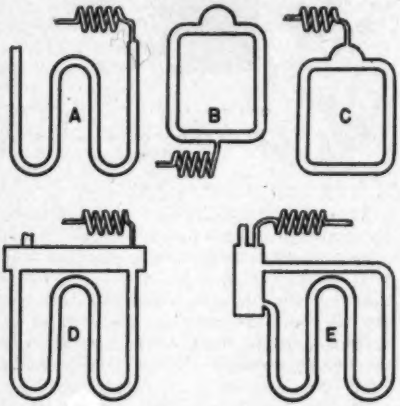
SERVICE POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

CAPILLARY TUBES CAUSE NOISE

CAPILLARY tubes are being used quite extensively by servicemen to replace other types of metering devices in household refrigeration. They work satisfactorily but there is frequently a complaint of gurgling and rattling noise in the evaporator, most noticeable when the cabinet door is opened.

The rattling noise is usually caused by vibration in the coils of the capillary tube, set up by the rush of liquid through the coil. Check by holding the coil tightly in your hand and see if noise stops. If it does, tape coil firmly together to stop vibration.



The gurgling noise cannot be stopped in some types of evaporators. Remember that the capillary never completely shuts off the flow of refrigerant or vapor from the high side to the low side of the system, it merely restricts the flow. Remember, too, that the evaporator is always nearly full of liquid. The gurgling noise is caused by high pressure vapor passing through the capillary tube and bubbling up through the liquid filled evaporator. This bubbling or gurgling noise will continue for some minutes during the idle period or until the pressures in the high and low sides are equalized.

The continuous tube type of evaporator "A", as illustrated, and the bottom feed flooded type "B" are the worst offenders because the feed being at the bottom, all vapor must bubble up through the liquid to reach the suction outlet. The only bubbling in "C" of the illustration will be caused by the evaporation of liquid in the evaporator, and this is seldom audible. The noise in "B" can often be overcome by changing the connections from a bottom to top feed where the evaporator arrangement will permit. Type "A" coil can be corrected by installing a header as in "D", or if the evaporator is equipped with an accumulator, rearrange the connections as in "E".

DETECTING EXCESS OIL

THE most baffling trouble I have ever encountered is too much oil in circulation—especially in methyl chloride systems. Every serviceman remembers a few times he has diagnosed a "wet" system, heated the valve body and changed dryers four or five times and finally, apparently by the Grace of God or sheer luck, the mess cleared up.

I have finally stumbled upon a simple and nearly foolproof method of testing "Freon" or methyl systems for the condition of too much oil in circulation. Crack the flare nut from the receiver or dryer. Let a small amount of liquid out on a piece of cardboard. If the mixture of oil and refrigerant is normal it will vaporize rapidly and will leave hardly any residue. On the other hand, if there is too much oil in the refrigerant a white, waxy snow will immediately form at the point where the mixture strikes the cardboard. Also, the mixture will seal the point where you cracked the nut, stopping the leak almost completely. Apparently this is exactly what happens at the expansion valve, so that it looks like a stuck valve, moisture, etc.

If the system is fairly small I blow out all the oil and refrigerant at the receiver and recharge. If a large system, an oil trap

is better than trying to trap oil with dehydrators.—*Submitted by H. L. Myers, Nestor, Calif.*

* * *

LOCATING LEAKS

HERE is a way to locate those small, slow to appear, hard to find leaks around condensing units or any kind of machinery where pressure is involved, providing there is some kind of liquid combined with the pressure such as oil.

First clean the outer surfaces as best as possible, removing oil and dirt. Get a pint or quart can of black, *dull* finish paint. Paint the entire condensing unit, let dry and call back later. If there is a leak any place the oil will show up as plain as the nose on your face on the dull surface. Sometimes it takes weeks or months for a leak to appear but you sure can see the exact spot where the leak is. Guaranteed to work 100% for those who are putting their all behind their work. This method can be used on the job as well as in the shop. Make it your business to call back later—any time from one day to a year. If there is no oil deposit on the dull surface, there is no leak. Result: Satisfaction of mind and satisfied customer.—*Submitted by O. J. Paul, Hazel Park, Mich.*

FLARE CAPS

NOW that most commercial and air conditioning systems are equipped with a charging valve connected with a tee in liquid line, if the open end of this valve is not effectively capped, it is a frequent source of refrigerant leakage.

Plain flare caps will not seal without a gasket inside them, and if gasket is used originally they frequently fall out unnoticed when cap is removed. The same is true for a flare nut with seal bonnet. Many cases have been recorded where plain flare cap tight on charging valve allowed 80 lbs. of "Freon" to leak out in five months.

To make a positive cap, cut scrap tubing into two inch lengths, flare one end, and assemble flare nut. Pinch off other end one-half inch from end with pinch off tool or very blunt chisel. Fill end cavity with silfos or solder.

We first made these by filling dead end from inside, but some of the finished ones happened to get mixed with the unsealed ones and it was virtually impossible to see into tube to see which were sealed and which were not.

Do not use commercially sealed ends cut from new rolls of tubing. These will usually pop open at less than 200 lbs. pressure.—*Submitted by W. E. Patten, Baltimore, Md.*

"IT TOOK ME SIX YEARS TO GET ALL THAT ICE ON THE COILS AND HERE YOU MELT IT IN FIVE MINUTES!"

On Problems of Servicing and Installation of Refrigerating Equipment—Send Your Problems to the Question Box.

COMMENTS ON QUESTIONS

REFERENCE TO QUESTION 771—The trouble can be in the cold control, if it has a bakelite case. I have discovered controls having bakelite cases charred and even burned where the contacts are. This trouble is caused from arcing in making and breaking of the contacts. The bakelite case when charred or burned smells like iodine. When the refrigerator is defrosted some of the condensation comes in contact with the control case and drips into the ice cube trays which would cause the cubes to become contaminated and taste like iodine. This will not affect the other items in the refrigerator unless the control case is badly burned.—*James J. Rada, Jr., Pascagoula, Miss.*

REFERENCE TO QUESTION 771—The black rubber cases in which some thermostat switches are mounted leave a very disturbing odor. The contact blocks of other switches with steel cases are the same. Please have this fellow check these pointers and I think his troubles will be over.—*Elmer Frierdich, East St. Louis, Ill.*

REFERENCE TO QUESTION 771—Since I have had quite a bit of experience with odors in refrigerators, I was quite interested in this question. I believe the odor described as iodine is probably closer to what I call a formaldehyde odor which I have encountered a number of times. I have traced this odor to different sources and would like to give the questioner the benefit of my experience.

One source can be loose connections in the temperature control, causing the surrounding plastic to burn or char. This will cause an odor and since the taste is only in the cubes, in this case, it is the most likely cause in the case described.

Another cause for odor is citrus fruits, particularly oranges. They use some kind of preservative on the fruit and it does give off an odor, but usually this will permeate everything in the refrigerator. When I trace an odor to oranges the customer does not usually believe me until they try it without oranges and find no odor.

Another cause is from plastic door trim strips, but this is rare. One other cause is the rubber ice tray but this is also rare.—*Ed. Vadakin, East Cleveland, O.*

REFERENCE TO QUESTION 773—I suggest that the serviceman remove the entire condensing unit and carry it where he will have plenty of room and light, then remove the electric motor and switch and cover the compressor with canvas, especially around the seal, and then thoroughly wash the condenser and receiver with gasoline and a paint brush and rinse with hot water. He should be careful that all openings are plugged to keep water out of compressor.

I have had quite a bit of experience with restaurant equipment and have worked behind good servicemen. I find that over a period of time the grease in the air will form a thin coating over the condenser and receiver and that this coating will insulate so well that it is impossible for the fan to cool the gas. I suggest that he put in a new compressor valve plate and valves and install a sight glass in the liquid line. He should take his time and do a good job of cleaning the condenser. I have had practically the same trouble that he is having on York, Kelvinator and Frigidaire units in restaurants and eating places and this job did the work every time.

If he attempts to clean the condenser without removing the condensing unit, he should use kerosene, as gasoline would be a fire hazard especially when the motor started.—*Avery G. Asbill, Bishopville, S. C.*

REFERENCE TO QUESTION 773—May I make a simple suggestion, rather than go into detailed theoretic or high "falootin" diagnosis as to the probable, possible cause of illness aggravating that Mills unit. Sage advice. 1—Purge overcharge. Yes, I said OVERCHARGE of refrigerant—PERIOD.—*M. G. Horwitz, Washington, D. C.*

REFERENCE TO QUESTION 778—There is one other possibility causing this unit to bounce. The counterbalance on the eccentric or crankshaft may be off 180 deg. from its in-

tended position.—*E. A. Plesskott, St. Louis, Mo.*

REFERENCE TO QUESTION 778—The Universal unit uses 4 cylindrical mounting springs (3 different sizes). As I remember, the two of the same size fit to the front of the refrigerator but I could be wrong. Interchanging springs throws unit off balance.—*Joe Gerson, Jackson, Tenn.*

MEAT DRIES OUT AND COMPRESSOR STICKS

QUESTION 779: I would appreciate very much your advice on the following problem. I received a call from one of my customers on a Tyler reach-in refrigerator, 43 cu. ft., powered by a ⅓ hp. Kelvinator condensing unit. I was informed by the customer that he keeps meat in this refrigerator overnight, but on the following morning that meat turns black and hard. I informed him that this type of refrigerator was not built to keep meat in for resale purposes. He admitted that he has been using this particular box for the past four years and the meat has always been a little hard and black, but recently it has been worse than ever.

I checked the valve plate and found it to be OK. Head pressure about 140 lbs.; the control set to cut in at 30 lbs. and cut out at 14 lbs.; the average temperature was 36°; the coil was on a defrost cycle. I thought maybe the coil was frosting up a little too much, causing the humidity to drop too low, so I changed the setting to 18 lbs. and 40 lbs. but without results. The fan and motor are the same that came with the box.

Ice Cream Cabinet

My second problem concerns a hardening ice cream cabinet, powered by a one hp. Brunner compressor. The temperature is OK but every time the unit stops the compressor becomes very hard to turn over and so the line starter kicks it off on trying to start up, even if the unit stops for 30 minutes. I checked the valve plate and it was OK. It held a vacuum for about 8 hours. The oil in the crankcase was OK. The head pressure 125 lbs. with a very cold box. The sight glass full. I installed a large dehydrator with no results. The suction and head gaskets were changed but with no results. I balanced the compressor, closed both suction and discharge service valves and allowed the gas to escape through the discharge port so that no gas would be left in between the discharge valves. On trying the compressor it turned freely with one finger.

Could something be wrong with the discharge valves? On this particular job I called in engineers to assist me. They all agreed it was a defect in the compressor, but no one could offer a solution.

ANSWER: I am inclined to think that your trouble is still a lack of humidity and too much drying effect by high velocity of air passing over the meat. As you have informed your customer, this refrigerator is not suitable for the storage of meat, and the only thing that can be done to improve conditions at the present time is to increase the size of the blower coil and reduce the velocity of air through it.

Undoubtedly, at the present time, the temperature will rise too high if the velocity is cut down and the refrigerant temperature increased in order to increase humidity in the cabinet. However, you could make an effort to better conditions by blocking off part of the air passing through the blower coil, or by decreasing the speed of the fan, if this is possible. The suction pressure should be increased to as high a point as possible and at the same time maintaining desired temperatures in the refrigerator.

Compressor Sticks

At first reading of your question regarding the ice cream cabinet, I was inclined to think your trouble was due to gummy substances. Where there is gummy substance in the oil, the action of the compressor would be much as you have described it. In other words it would be difficult to start, having a tendency to stick as it cools off, but once it had gotten under way again and lubrication reaching all parts, the compressor would free up and run smoothly. However, you state that the compressor runs freely at all times when pressure is eliminated from the discharge side of the compressor. This leaves me with one suggestion to make and that is that there is a possible chance that this compressor was designed for methyl chloride but being used with F-12. Many of the compressor manufacturers use the same design of compressor and the only change for the two refrigerants would be in the design of the valve plate.

Valve plates or discharge valves require a little more clearance when used with F-12 than when used with methyl. It might be well to purchase a new valve plate specified for F-12, or at least write the Brunner Mfg. Co. for their advice on this suggestion.

You Want "Freon" and Methyl?

—Then You Can Help!

THE industry is concerned about the supply of "Freon." Boiled down, the problem for the present, at least, is the shortage of containers. That's where you can do your part and materially help by making it a "must" to

Return Cylinders Promptly

According to the manufacturers of "Freon," there were several months in which full production of "Freon" was curtailed because of lack of cylinders to fill. Production lost now will be seriously felt next summer or on new installations—so you can help yourself by keeping cylinders moving.

Don't Hoard Freon

Hoarding "Freon" now, in anticipation of building a stock, will not help you when you need it most during the heavy servicing season. Use your normal requirements, but get those cylinders back. To avoid a shortage, the solution is to keep "Freon" moving into channels of distribution and the only way it moves is in cylinders.

Keep Those Cylinders Moving

Orders for new cylinders have been placed and as soon as they are received more "Freon" will find its way to your wholesaler.

Return Cylinders Promptly

You can help yourself and assure a supply of "Freon" when you need it most by following the simple rule of—*Not Hoarding* and *getting empties back to the wholesaler without delay.*

The Methyl Chloride Situation

Methyl Chloride production is sufficient for the demands of the industry, but again as in the case of "Freon," return of cylinders is vital to assure an uninterrupted supply. One manufacturer reports, "From time to time we have purchased additional cylinders when possible to do so, but have found that a supply of new cylinders has afforded only temporary relief as it appears they are absorbed in the trade and do not return promptly for refilling. We do not know why this is, as we have tried every means we can think of to expedite the return of empty cylinders and to urge all consumers to make a serious attempt to get rid of empties as promptly as possible. We feel that we have sufficient cylinders in this service to handle much more business than we handle at present, but to give service, cylinder turnover must be improved, as in any case, new cylinders cannot be purchased at this time.

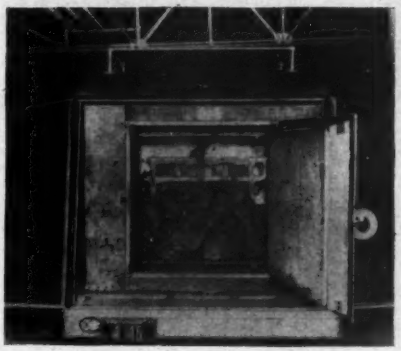
"I am referring to standard sizes of cylinders, namely those holding 60 pounds net and upward. The smaller cylinders which we have offered to the trade in limited numbers are not now offered because we find that our turnover of 20 pound cylinders is approximately once every 14 years.

"As a move to improve the handling of empty cylinders we changed our method of refunding cylinder deposits on January 1, 1946. Prior to that date we returned cylinder deposits to the person originally purchasing the cylinder, in most cases a wholesaler. This necessitated that wholesalers keep track of all cylinder numbers and accept from service men and other consumers only such cylinders as had previously passed through their hands. A wholesaler can accept any of our methyl chloride cylinders and allow full credit knowing that he will receive the credit from us when he returns it to us. No record of cylinder numbers is necessary, nor does the service man need to return an empty cylinder to the person from whom he bought it. He may return it directly to us for credit, which he will get promptly.

"For the past 5 years we have done everything we can think of to expedite return of empty cylinders, even to the extent of changing our method of returning cylinder deposits and some price schedules. The problem cannot be solved by the refrigerant manufacturers as the cure lies in the hands of the consumers, chiefly the refrigeration service engineers. If the importance of this matter can be brought to their attention and cylinder turnover is improved as a result, we do not believe we will have any difficulty in supplying to the trade methyl chloride in an amount even greater than at present."

Bringing Home the Game . . . Fresh Frozen

Here is a hunter who dresses and quick-freezes his game right in the field. Cady L. Daniels with his deluxe hunting trailer. Open door in trailer exposes Onan unit.



Temperatures to 30 degrees below zero keep game in prime condition in this trailer-freezer compartment.

CADY L. DANIELS of Colorado Springs, Colo., is designer and owner of a deluxe hunting trailer with a built-in refrigeration unit powered by an Onan W3S Electric Generating Plant.

On a hunting trip to South Dakota last fall, Daniels and a group of friends stored their "bag" of pheasants in the freezing compartment. After enjoying several days of good hunting, they returned to Colorado Springs with their quick-frozen birds in perfect condition.

Daniels' paneled trailer is divided into three sections. The large cold-storage compartment, installed at the rear, has a capacity of four dressed and cut-up deer. It is equipped with six cold-plates which make possible temperatures as low as 30 degrees below zero. A center compartment of the trailer houses the 3,000-watt Onan Electric Plant controlled by remote push-buttons or an automatic panel, and a ½ horsepower Frigidaire compressor. A large front compartment provides storage space for hunting equipment, canned goods, cooking utensils, tables and chairs.

In addition to supplying power for the refrigerator compressor, the Onan plant provides Daniels with real home comforts while in the field, including lights and heat. A specially designed wall tent, equipped with wiring for electric lights and a heating vent, is set up broadside to the trailer. On cold mornings, Daniels starts his unit by remote push-button controls without getting up from his cot. The pusher type fan forces warm fresh air through the radiator of the Electric Plant, down a canvas vent pipe and into the wall tent. In 7 to 8 minutes, the tent is comfortably warm.

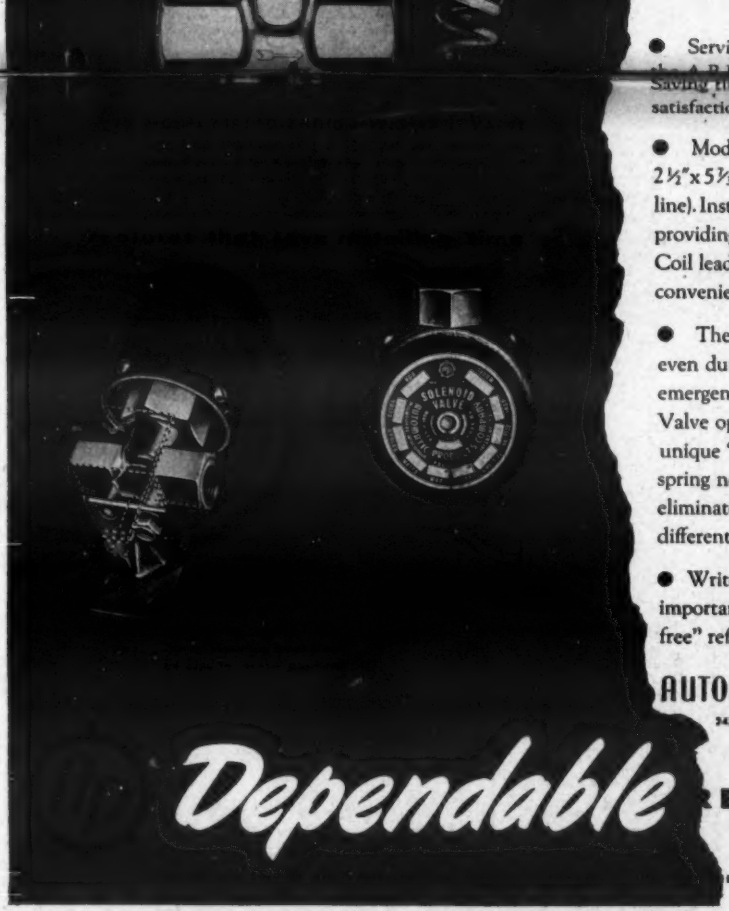
With an independent source of electric power, Daniels' trailer outfit eliminates many of the problems and discomforts encountered while hunting in remote country during the cold autumn season.

* * *

TRULY big figures are being used to estimate both the immediate and future markets for refrigeration and air conditioning equipment. The market for new home refrigerators is expected to continue at boom levels for 5 to 10 years, with 5,000,000 to 7,000,000 new refrigerators in immediate demand. The Rural Electrification Administration estimates that an additional 1,329,000 farms will be receiving electrical service by 1949, and that alone justified sales optimism in the farm field.

Solenoids Combine Unusual Operating and Service Features...

- Service Engineers get a "double" break when they install the A-P Model 73B1 Solenoid Refrigerant Valve. Saving time on easier installation and building customer



Dependable

- Service Engineers get a "double" break when they install the A-P Model 73RJ Solenoid Refrigerant Valve. Saving time on easier installation and building customer satisfaction by its DEPENDABLE long-life efficiency.

- Model 73RJ fits in small space (overall dimensions 2½"x5 7/32") yet it has a capacity up to 7 tons Freon (liquid line). Installation is simplified by the handy mounting bracket, providing quick, rigid mounting in several positions. Coil leads can be moved to one of ***four*** positions for added convenience in electrical connection by rotating coil cover.

- The Model 73RJ is "Over-Powered", and will fully open even during reduced voltage and heavy current load emergencies, because it is tested at 85% of its rated voltage. Valve opens more easily and surely because of its unique "floating impact type" plunger (no "kick-off" spring necessary). The unique "shading coil" on the plunger eliminates vibration and noise. Operates at a pressure differential up to 180 lbs.

- Write for bulletin RS 110 for further details on this important A-P contribution to more DEPENDABLE "service-free" refrigeration. Or see it at the best Jobbers.

AUTOMATIC PRODUCTS COMPANY

3434 NORTH THIRTY-SECOND STREET, MILWAUKEE 10, WISCONSIN
Export Dept. 13 E. 40th St., New York 16, N. Y.

REFRIGERANT VALVES

D AND INSTALLED BY LEADING REFRIGERATION SERVICE ENGINEERS

The Importance of
Recording Serial Numbers

THE many parts and material substitutions made necessary by war and post-war scarcities, make it more important than ever for servicemen to report serial numbers when writing a manufacturer concerning the performance of equipment or when ordering replacement parts. There was a time when the manufacturer might know, for instance, what type and make of motor was furnished with equipment of a certain model and size. Today, the manufacturer may, of necessity, be supplying that equipment with several different makes of motors. He must be given the serial number before he can tell exactly what parts are furnished on any particular piece of equipment.

In the past, some servicemen have felt that it was sufficient to record serial numbers only for the high side, because the compressor, controls and other moving parts of the high side are necessarily more subject to wear and more apt to require eventual repairs or replacements than were the simple gravity circulation coils used so commonly until a few years ago. Although this is true, the increasing use of motor equipped, forced convection cooling units and of low side controls has also introduced moving parts into this end of the equipment.

Maintenance of a complete and systematic system for recording serial numbers for *all* equipment, may save a thirty-mile trip into the country just to find the serial number on some small part; or it may save still further hunting, seeking or correspondence if the original nameplate has been removed or lost. Serial numbers can be recorded on forms along with other necessary information on each installation including data on refrigerant charges, pressures, service calls, etc.

Only by adequate record-keeping can the refrigeration serviceman render the prompt and satisfactory service necessary for the building of a successful business.

The installation and service record form illustrated here is a suggested method of gathering and filing the necessary informa-

Name _____ Phone _____

Street _____ City _____

Business _____ Application _____

Refrigerant _____ Date Installed _____

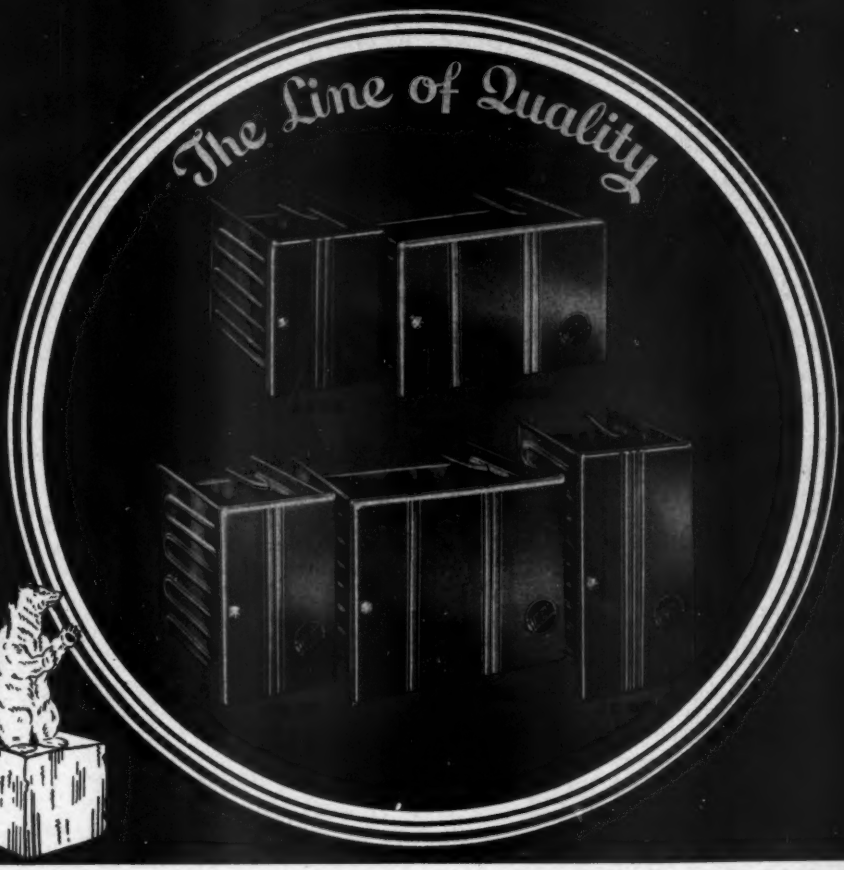
Pressure- Cut-In _____ Cut-Out _____ Load Temperature _____

Equipment	Make	Model No.	Serial No.	Remarks

SEE OTHER SIDE FOR RECORD OF SERVICE

Suggested form for recording serial numbers.

STANDARD EVAPORATORS



MODEL No.	JS-25	JS-422	JS-35	JS-633	JS-45
Trays	1 Single 1 Double	2 Single 2 Double	1 Double 2 Single	4 Single 2 Double	3 Single 1 Double
Cubic Ft. Capacity	4 to 6	8 to 10	5 to 8	10 to 12	9 to 12

Standard Refrigeration Company

20 NORTH WACKER DRIVE *CHICAGO 6, ILLINOIS*

tion on each refrigerating system. It is an elaboration of the service record card now used by many service companies. The information on the card should be obtained at the time the installation is made, or if this work was done by some other company, the information can be obtained on the first service call. Servicemen could carry a few cards in the back of their service order book and when the dispatcher informs him that the call he is receiving is the first one from that customer, the card can be filled out and returned to the dispatcher for filing.

The card can also be used when a survey of your territory is being made with a view to obtaining new business. As each call on the prospective customer is made, and while you are surveying his equipment, the information on the card can be obtained. Thus you will have some very useful information ready for the time you receive your first service call on the equipment.

The first two lines on the card are used for the name, address and phone number of the customer. The type of business, such as butcher, dairy, manufacturer, etc., is entered after "Business." After "Application" enter the type of installation such as walk-in cooler, collant cooler, milk cooler, air conditioning, apartment multiple system, etc. In the case of a butcher shop where two or more fixtures are operated off one unit, enter

(Continued on page 72)

GUILD ADOPTS CODE OF ETHICS

THE members of the Refrigeration & Air Conditioning Guild, Inc., Brooklyn, N. Y., have adopted a Code of Ethics and Rules of Business Procedure for ethical business dealings and as a general guide, with the understanding that the following rules do not deny existence of others not specifically mentioned.

I. Service Charges

Sec. 1—Establishment of fair competitive price practices to insure fair and legitimate profits, permitting the refrigeration contractor to complete his responsibilities to the consumer after the sale.

Sec. 2—To abstain from the practice of offering free service or cheaper than normal prices for service for the sole purpose of catching an unwary consumer and overcharging him in another item to make up for the free service.

Sec. 3—The consumer should not be made to pay more than the list price for refrigeration equipment or material plus the actual labor charge per man per hour, whether priced on a time and material basis or on a lump sum basis.

Sec. 4—The consumer is entitled to full protection in the carrying out of the refrigeration contractor's warranty and guaranty.

II. Unfair Interference

Sec. 1—Efforts direct or indirect in any way to unfairly encroach upon the business of another refrigeration contraction, are unworthy of a legitimate refrigeration contractor; but nevertheless, it is the right of any contractor to bid in on any job that was presented to him in the normal course of business.

Sec. 2—A refrigeration contractor should not ignore known customs or practices of the refrigeration industry, without giving his competitor fairly and timely notice.

Sec. 3—A refrigeration contractor shall not knowingly or willfully by any means whatsoever interfere with any contract now in existence between contractor and customer, for the express purpose of appropriating the business of the contractor.

Sec. 4—The aspersion of the character of a competitor which questions his business integrity, his credit standing or the ability, quality or reliability of his service is condemned as an unfair trade practice.

Sec. 5—No refrigeration contractor shall pirate an employee from another contractor. No refrigeration contractor shall hire an employee of another refrigeration contractor without first notifying the former employer that he is so hiring such employee.

III. Customer Complaints

Sec. 1—A refrigeration contractor, upon receiving a complaint from a customer, that his competitor has violated any of the principles herein stated, or is dissatisfied with the work performed by the competitor, shall personally contact his competitor to ascertain the truth or untruth of the customer's complaint. The refrigeration contractor shall not use the information received by the customer's complaint unless and until he has personally investigated and ascertained that such complaints are true.

IV. Signed Orders

All orders shall be in writing and signed by the customer except in special instances. A refrigeration contractor shall not send a customer to a wholesale jobber or material supplier with an order on his own business card, but shall at all times send a signed written order for such material.

V. Invoices

Every customer shall be given a written invoice and bill with labor, material and tax items separately stated and a guaranty if any agreed upon, shall be completely printed on such bill or invoice.

ABSOLUTE ZERO

If you were to step from the sun-lit surface of the Moon into a crater-shadow, you would be plunged into inky darkness and inconceivable cold. Here the temperature hovers near the "absolute zero" of outer space, the utter absence of heat.

Man cannot artificially achieve this abysmal cold . . . would have little practical use for it if he could. However, in his numerous and daily uses for refrigerated spaces, varying degrees of cold must be economically produced and maintained. Ease of access and effective seal are assured, when the installation includes appropriate Jamison-built doors.

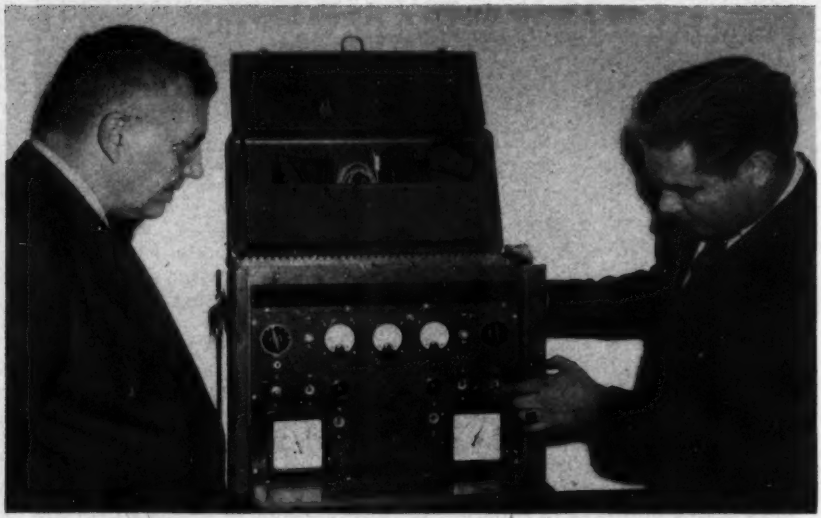
For nearly half a century, the Jamison name-plate on a cold storage door has stood for expert design and precise, painstaking workmanship . . . uniformly dependable operation over a long life of rigorous use.

Today's outstanding Jamison line . . . Jamison, Stevenson, Victor, and NoEqual Doors, and related products . . . serves the diverse needs of the refrigeration, cold storage, and frozen food industries. For full information concerning the complete Jamison line and the address of your nearest factory-branch, write Jamison Cold Storage Door Company, Hagerstown, Maryland.

Factory Branches in Principal Cities, Coast to Coast

JAMISON
COLD STORAGE DOORS

New Hermetic Analyser



The new refrigerator motor starter and analyser for sealed and open units, developed by Edward Friese, left, and R. L. Tucker, right.

ONE of the interesting sidelights of the Alabama State Convention at Whitley Hotel in Montgomery was the showing and demonstration of a new refrigerator motor starter and analyser for sealed and open units patented and developed by Edward Friese, Birmingham Chapter R.S.E.S. and Robert L. Tucker, son of C. S. Tucker, International Director R.S.E.S. Keen interest was shown in the operation of this machine by the attending members and guests.

Features of this unit explained and demonstrated by Mr. Tucker and Mr. Friese were:

Positive and rapid reversing of the refrigerator motor by external means at any desired voltage. This internal rocking motion will free stuck units that respond to no other method.

Built in protection against burning out motor.

Built in meters that accurately detect source of trouble.

One three-wire harness and switch that gives all combinations of running, starting and common wires.

Determination of high and low side pressures without cutting into lines.

From any 110 volt socket through this machine you may get 110 volt, 220 volt, and 440 volt.

Positive and accurate detection of overloaded motor.

Accurate determination of correct motor pulleys.

These are only some of the features of this machine. This machine takes the guesswork out of servicing sealed units. In tests of 107 sealed units turned in to a distributor as defective, 71 were started by this machine alone. On the remaining 36, accurately determined the source of trouble such as burned out motors, defective floats, and capillary tubes. This knowledge greatly simplified repairs.

\$ \$ \$

IT NOW is estimated that refrigeration and air conditioning perform more than 200 essential services, ranging from 80 degrees above zero to 150 degrees below zero and colder. At least 31 principal industries regard air conditioning as an essential in controlling temperature and humidity as an aid to manufacturing processes. These include chemical, textiles, food, metal working, synthetic rubber, printing, tobacco and aircraft—all industrial leaders.

designed...

for longer life and easier service

New Types SV31 and SV51 Henry Solenoid Valves Can Be Serviced from the Bottom of Valve Body Without Disturbing Piping or Electrical Connections

general

Specifications

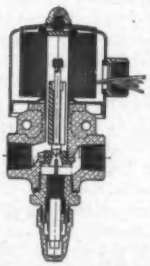
FOR TYPES SV31 AND SV51

For Freon, Methyl Chloride, Water, Air, Oil, Gas, Etc.

1. Easy-to-service come-apart construction with access to all internal parts from bottom of valve.
2. Removable seats.
3. Manually operated stem for emergency use.
4. Valve body made of dense bronze casting. Silver brazed joints.
5. Stainless steel internal parts.
6. Securely fastened coil housing prevents strain on top of plunger enclosing tube.
7. 4 position coil housing through 360°.
8. Triple impregnated coils, moisture repellent, low current consumption. Flamenol lead wires.
9. Two mounting holes permit mounting from either sides of valves.
10. Standard Voltages 115/60 and 230/60 A.C. Dual voltage coil.

Announcements from time to time of additional new Henry Solenoid Valves will convince you of this fact: *True to the Henry tradition of always building a better product, the Henry line of Solenoid Valves today leads in design features.* Typical examples are the three and five ton, SV31 and SV51, which have come-apart construction. For the first time small valves of this type now have the *optional* feature of a manual stem lift for emergency operation. Why not check Henry specifications before you buy. Ask your jobber for details.

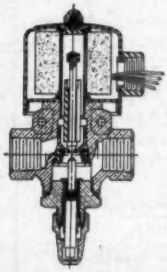
individual specifications



TYPE SV31

Nominal Capacity 3 Tons Liquid Freon

Two piece impact plunger with direct acting metal-to-metal seat.



TYPE SV51

Nominal Capacity 5 Tons Liquid Freon

Two piece impact plunger operates pilot port in piston. Molded synthetic ring provides soft seat at main port for piston. Seating qualities, therefore, are superior to conventional construction.

HENRY VALVE COMPANY

Control Devices, Valves, Dryers, Strainers and Accessories for Refrigeration and Air Conditioning and Industrial Applications

3260 W. GRAND AVENUE • CHICAGO 51, ILLINOIS

Cable: HEVALCO, CHICAGO

NEWS and ACTIVITIES

Announcements of the activities and educational work of the International Society and Local Chapters appear in this department.

COMING CONVENTIONS

Buckeye State Assn., R.S.E.S.
City: Columbus, Ohio.
Date: January 25, 26.
Secretary: M. Bokesch, Sr., 2328 Mahoning Ave., Youngstown, Ohio.

Wisconsin Assn., R.S.E.S.
City: Milwaukee, Wisconsin.
Date: March 15, 16.
Secretary: Walter Bullis, 1016 Grove Ave., Racine, Wisconsin.

Interprovincial Assn., R.S.E.S.
Place: Mount Royal Hotel.
City: Montreal, Quebec, Canada.
Date: March 16, 17.
Secretary: E. G. McCracken, 215 Laird Drive, Leaside, Ontario, Canada.

R.E.W.A. Spring Meeting
Place: Edgewater Beach Hotel.
City: Chicago, Illinois.
Date: March 20, 21, 22.
Exec. Secretary: H. S. McCloud, 920 E. McMillan St., Cincinnati 6, Ohio.

R.E.M.A. Spring Meeting
Place: Edgewater Beach Hotel.
City: Chicago, Illinois.
Date: April 9-12, incl.
Exec. Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pennsylvania.

California Assn., R.S.E.S.
Place: Hilton Hotel. (Exhibits: Long Beach Municipal Auditorium).
City: Long Beach, California.
Date: April 25, 26, 27.
Secretary: G. S. Kennedy, P.O. Box 921, Sacramento, California.

R.E.M.A.—All-Industry Exposition
Place: Cleveland Public Auditorium.
City: Cleveland, Ohio.
Date: January 26-29, incl., 1948.
Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pennsylvania.

ALABAMA STATE ASSOCIATION HOLDS 3RD CONVENTION

THE 3rd annual meeting of RSES members of Alabama convened in Montgomery, December 2nd and 3rd, at the Hotel Whitley. While this was the third state meeting, it was the first as a regularly chartered association, when President John M. Manley, of the state organization and Montgomery Chapter, formally received the charter for the state association from International Secretary H. T. McDermott. Alabama chapters participating included Montgomery, Birmingham and Azalea City of Mobile.

Monday evening, a complimentary dinner was enjoyed by the members of the Society, with T. O. Cooper, Harris Supply Co., Mobile; Robert Gennett, Refrigeration Supplies Distributor, Birmingham; D. M. McInnis, Nolin-McInnis, Inc., Montgomery; W. R. Watson, Teague Hardware Co., Montgomery; and C. V. Hale, Noland Co., Newport News, Va., acting as host. E. V. Dunbar, Atlanta, Ga., acted as toastmaster and International Secretary H. T. McDermott talked on "The Relationship of the Wholesaler to the Service Man."

The Tuesday luncheon was provided with the compliments of manufacturers and manufacturers' representatives, the hosts being Joe Parker, Atlanta, Ga., Manufacturer's Representative; Vernon Cook, Dayton Belt Co., Dayton, Ohio; Howard Lawson, Weatherhead Co., Cleveland, Ohio; L. C. Warren, Orr's Refrigeration Co., Atlanta, Ga.; Austin Brown, Manufacturer's Representative; Bill Edwards, Detroit Lubricator Co., Detroit, Mich.; R. E. Peterson, Automatic Products Co., Milwaukee, Wis.; Paul Hayden, Manning, Maxwell & Moore, New York, N. Y.; W. G. McGuire, Manufacturer's Representative; E. V. Dunbar, Atlanta, Ga., Manufacturer's Representative; Arley Baker, Alco Valve Co., St. Louis, Mo.; Leonard Wright, Alco Valve Co., St. Louis, Mo.; Judd Bowen, Manufacturer's Representative; Paul Domke, Mueller Brass

The Low-Temp Patrolmen!

THAWZONE and TRACE are two "musts" in protecting refrigeration systems and keeping them functioning perfectly with the minimum of attention.

THAWZONE, in new, reconditioned or old systems, has a two-fold purpose: (1) To destroy moisture already present and causing trouble, (2) as a safeguard against future trouble in systems now functioning satisfactorily. THAWZONE also removes other trouble-causing elements such as oxygen (air) and acids.

TRACE spots leaks . . . present or future. Its vivid stay-red color indicates them plainly. Add it to any refrigeration system and be ready for the red signal.

Season's Greetings and Best Wishes for the New Year

. . . and we haven't raised our prices!

HIGHSIDE CHEMICALS COMPANY

195 VERONA AVE. **NEWARK 4, N. J.**

Three highlights of the Alabama state meeting are pictured above. In the top view J. M. Manley, President, and Alabama State Association officers receive charter from International Secretary H. T. McDermott. Center view: The Jobbers dinner with RSES officers as guests. Bottom: Manufacturers luncheon.

Co., Port Huron, Mich.; William Rapp, Mueller Brass Co., Port Huron, Mich.; James B. Maxwell, White Rodgers Co., St. Louis, Mo.; George Eager, Servel, Inc., Evansville, Ind.; Paul Reed, Perfex Corp., Milwaukee, Wis.; Robert Dunlop, Ranco, Inc., Columbus, Ohio; Cecil Boling, Heat-X-Changer Co., Brewster, N. Y.; and Willis Stafford, Chicago Seal Co., Chicago, Ill. Joe E. Parker, manufacturer's representative of Atlanta, Ga., served as toastmaster for the luncheon.

Concluding the entertainment features on Tuesday evening a barbecue, entertainment and dance was held at one of Montgomery's well known show places.

In opening the meeting on Monday afternoon, Mayor John L. Goodwyn of Montgomery welcomed the guests to the city, and President J. M. Manley of the state association responded on behalf of the Society.

Arley Baker, Assistant Sales Manager of the Alco Valve Co., St. Louis, Mo., and Leonard Wright, District Engineer, opened the educational program presenting a discussion of the Thermal Limit Valve, using the glass evaporator for an actual demonstration of the operation of the valve.

Judd Bowen, representative of Kramer-Trenton Co., Trenton, N. J., outlined the development of various methods of defrosting coils and unit coolers, and with the aid of slides explained the Thermobank low side equipment and its application in below freezing installations.

Tuesday morning, Paul O. Domke, Sales Manager, Refrigeration Products Div., Mueller Brass Co., Port Huron, Mich., explained "The Refrigeration Cycle." Emphasizing the value of the dryer and strainer in the system, Mr. Domke related a number of practical operating experiences with dryers and drying agents. He referred to experiments now being conducted with a drying agent known as Sova beads.

Cecil Boling, President of Heat-X-Changer Co., Brewster, N. Y., predicted the increased use of heat exchangers in installations. His talk included a description of the concern's new liquid cooler.

"Development in Shaft Sealing" by Willis Stafford, Chicago Seal Co., Chicago, Ill., traced the early development of seals and the manufacturing refinements adopted in modern practice for providing satisfactory replacement and original equipment seals.

Robert Dunlop, Secretary, Ranco, Inc., Columbus, Ohio, gave credit to the service engineer for the continued development of commercial and domestic controls. He pointed out that experience in the field enabled company engineers to continually improve and expand the applications of controls for better refrigeration performance.

Tuesday afternoon, George S. Eager, Service Manager, Servel, Inc., Evansville, Ind., using a cutaway model and a glass enclosed compressor, described construction features of Supermetic condensing units.

"Controlling Multiple Systems," by Paul Reed, International RSES Educational Chairman, provided a blackboard talk on controlling multiple systems.

Officers of the Alabama Association are: *President,* J. M. Manley, Montgomery; *1st Vice-president,* Robert Gennett, Birmingham; *2nd Vice-president,* J. A. Robertson, Mobile; *Secretary-treasurer,* J. M. Gantt, Montgomery; *Sergeant-at-Arms,* P. C. Clemments, Mobile.

NOW . . . a cold-box type "Serviceman"

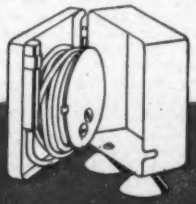
RANGE −30° to +65°!

Marsh does it again . . . first!

IT'S the celebrated Marsh "Serviceman" with range increased to match your ever-increasing work on quick freeze units. Yes, it now indicates from —30 to +65 degrees F. Along with this it has all the features of the original "Serviceman"—the same accuracy, same utility, same ability to tell you what's going on behind the closed door. Here is a "must" for your service kit.

JAS. P. MARSH CORPORATION, 2057 Southport Avenue, Chicago 14, Illinois

★ A heavy-duty precision movement, guaranteed accurate within one degree. Has Marsh "Recalibrator" to *keep* it accurate. Note hinged back containing bulb and 5 ft. of tubing slender enough to pass between refrigerator door and jamb. Suction cups prevent slipping and protect surfaces. The "Serviceman" is still available in ranges—10° F. to +100° F.



MARSH

Refrigeration Instruments

CANADIAN MEETING IN MARCH

THE 8th annual Refrigeration Convention sponsored by the Interprovincial Association of the RSES will be held at the Mount Royal Hotel, Montreal, Canada, on March 16th and 17th. Registration will commence Saturday, March 15th. A complete program of speakers and entertainment is being arranged for the enjoyment of the attendance.

NEW CHAPTERS IN THE MAKING

• PADUCAH, KY. — A new chapter to be known under the name of Jackson Purchase Chapter is in the process of formation in the city of Paducah, Ky. Formal petition for charter was made September 19, 1946, and signed by 11 members. At the first business meeting of the chapter, held November 15th, permanent officers were elected. They are Ralph Lindsey, *President;* M. Mauzy, *Vice-President;* E. W. Adams, *Secretary-Treasurer;* and Forrest Mellott, *Sergeant-at-Arms.* Regular meeting dates were set for the first Tuesday in each month. Plans are being made at the present time for the charter presentation to be held early in January at a dinner meeting. C. S. Tucker, International Director from Birmingham, will make the presentation.

• GREAT FALLS, MONTANA — Plans are being made to call a meeting January 20th for the purpose of completing the formation of Great Falls Chapter in Great Falls, Mont. Petition for charter has already been presented with 18 signers. J. L. Driskell of Burley, Idaho, International Sergeant-at-Arms, will be in attendance to help in the organizational meeting.

• NORFOLK, VA. — On September 18th an organizational meeting was held in Norfolk, Va., for the purpose of organizing the Tidewater Chapter. There were quite a number of members-at-large in the area who wished to affiliate with the chapter and would thus form a nucleus of the organization in that city. Plans are now being made for the charter presentation on January 22nd and at this date there are 71 charter members to appear on the charter.

• COUNTY OF IMPERIAL, CALIF.—On December 20, 1946, a group of men in the County of Imperial, Calif., petitioned the National Society for a chapter charter to be known as Imperial Valley Chapter. Petition was signed by 33 men, all of whom are members or in the process of becoming members.

• AUBURN, MAINE—A meeting was held December 3rd in Auburn, Maine, for the purpose of forming a chapter in that area. D. J. Daris of the D. J. Daris Company called the meeting which was attended by 50 men engaged in refrigeration work. Mr. Daris was elected temporary chairman. Chas. C. E. Harris, International Second Vice-President, and W. E. Tierney of Worcester, Mass., were two of the speakers of the evening. Signatures on the application for charter are being received and formal application will be made shortly.

• ELMIRA, N. Y.—On December 5th a meeting of the men in the city of Elmira, N. Y., met under the guidance of Carl Stewart of the Empire Refrigeration Supply Co., for the purpose of considering the formation of a chapter. Formal application for charter was signed by 40 men at this meeting and presented to the International Society.

Chapter Notes

• AKRON CHAPTER, *Akron, O., Dec. 11*—The educational films 440 and 441, with accompanying slides, were shown and greatly appreciated. The annual election of officers followed the Nominating Committee's report with these results: Francis J. Roller, *President;* Ralph Husted, *1st Vice-President;* F. L. Jones, *2nd Vice-President;* Walter E. Campbell, *Secretary;* Claude L. Wall, *Treasurer;* and Milt Cohen, *Sergeant-at-Arms.* Directors —Wm. Moyer, Frank E. McCormick and C. D. Gilchrist.

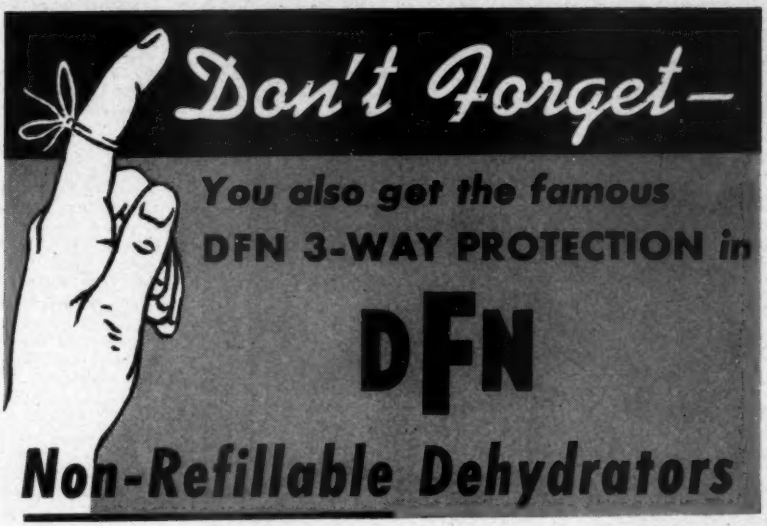
• ATLANTA CHAPTER, *Atlanta, Ga., Oct. 24*—The meeting was presided over by Ed Rawls, First Vice-President, due to the resignation of the President. The entire meeting was devoted to a discussion of a refrigeration code which is to be presented to the city of Atlanta for possible adoption.

• BOSTON CHAPTER, *Boston, Mass., Dec. 10*—The results of the annual election of officers are: James McCue, *President;* Wm. Paulin, *1st Vice-President;* Sidney Ashe, *2nd Vice-President;* George Champoux, *Rec. Secretary;* John Madden, *Business Secretary;* Chester Sherman, *Treasurer;* Page Conant, *Sergeant-at-Arms;* and Charles Galli, *Chairman of Educational Committee.* Board of Directors— Edward C. Hoyt, Chairman, J. Lawrence Hall, Gerald Bradford, A. O. Alexander and George Daley.

The guest speakers on the educational program were Messrs. Nicholas and Lydstone of Ideal Industries, Inc., and Mr. Kowalsky of United Wire & Supply Co. Mr. Nicholas and his associates demonstrated the use of Thermo-Grip pliers in soldering wire and welding tubing. Several of the members tried their hand following the demonstration.

• CHICAGO CHAPTER, *Chicago, Ill., Dec. 10*—The report of the Nominating Committee was received during the early part of the evening and their suggested slate elected to office with the exception of Messrs. Dellheim, Dedich and Scott. These three gentlemen will be placed in office as soon as a change in constitution permits their election. The officers elected and soon to be placed on the Board are: Edward Riccio, *President;* John Heger, *1st Vice-President;* Pat Doyle, *2nd Vice-President;* John Habich, *Treasurer;* Floyd Lilley, *Secretary;* Al. Dellheim, *Recording Secretary;* and Louis Norris, *Sergeant-at-Arms.* Board of Directors—Fred Stevens, Chairman, Martin Brundermann, Joe Barys, Joe Dedich, E. W. Scott. Educational Director—Francis Frazee, Chairman.

• COLONELS CHAPTER, *Louisville, Ky., Nov. 21*—Showing of the educational films was the first part of the educational program. This was followed by a discussion on the slides acompanying the films. Messrs. Sorley, Hackman and R. O. Perrine, representatives of the Cutler Hammer Corp., were guests of the evening. The meeting was turned over to



Remember—non-refillable dehydrators are used for "permanent" installation. That makes it important to get the 3-way protection of DFN Non-Refillable Dehydrators, namely: dehydration — filtering — neutralizing. This means more efficient protection for longer periods. And, best of all, it costs no more than other types. Full range of sizes for every need.

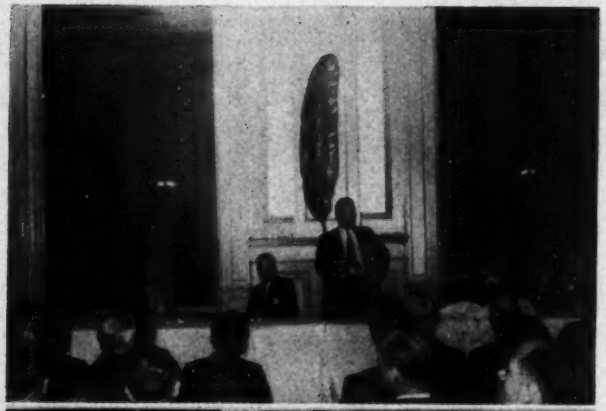
Sizes from 1/6 h.p. to 3 h.p. ratings. See your jobber, or write for details.

McINTIRE CONNECTOR CO. - - - 253 JEFFERSON ST., NEWARK 5, N. J.

Only the DFN SYSTEM DEHYDRATES FILTERS NEUTRALIZES

DEHYDRATORS • STRAINERS FILTERS • NEUTRALIZERS

NEW ENGLAND STATES MEETING



These views were taken during the New England States Association meeting held November 17 at the Hotel Narragansett, Providence, R.I. Chas. C. E. Harris, International 2nd Vice-President, is shown addressing the meeting while seated at the speakers' table, left to right, are: Arthur Andreen, 1st Vice-President; Wm. Tierney, President; Lee Wallace, Secretary; and George Martin, Treasurer.

Reading left to right are: Walter Quimby, Mrs. Wm. Tierney, Chas. C. E. Harris, Wm. E. Tierney, Paul B. Reed, Mrs. Chas. Harris, Lee J. Wallace, Mrs. L. J. Wallace, Arthur W. Andreen and Mrs. Andreen.

Some of the RSES boys from Springfield Chapter showed the convention what not to do in refrigeration with some high-class equipment. A little magic has just been mixed in.

Photos by Dick Seddon

Mr. Perrine who gave an interesting talk on the products manufactured by his company. He illustrated his talk with slide films and models of various controls.

On December 11th a Christmas party and dinner was held at Dun Roven Inn. Members and their friends, numbering 45, attended this dinner meeting and a very pleasant evening was enjoyed by everyone. Plenty of good food and drinks were served followed by dancing.

The December 19th meeting was devoted entirely to business.

● DAYTON CHAPTER, *Dayton, O., Dec. 12*—The annual election of officers, held at this meeting, resulted in the following: G. H. Brock, *President;* Geo. W. Whitman, *1st Vice-President;* Robert Hoff, *2nd Vice-President;* Delbert R. Goll, *Secretary;* Chas. L. Ott, *Treasurer;* Geo. O. Snyder, *Sergeant-at-Arms;* and D. D. Denny, *Educational Chairman.* Board of Directors—Wade Reed, Ross Wentworth and Geo. Click.

● DES MOINES CHAPTER, *Des Moines, Ia., Dec.*—The first meeting of the season was held at the home of H. R. Brewster. The meeting was preceded by a dinner, followed by the initiation of three new members and a program presented by Burnell Wright.

ANNOUNCING
stainless steel beer coils in NEW Temprite coolers!!

The FIRST glass of beer is perfectly clear! No waiting for beer stone to form in the coils! No metal contamination! The new Temprite draught beer coolers, now available with *stainless steel beer coils*, give the user greater operating efficiency, greater security! Stainless steel, offers high tensile strength and an extremely smooth, clean surface! Patented Temprite control maintains a uniform 40° from the beginning to the end of every keg!

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous 80 40 *Liquid Cooling Devices*

45 PIQUETTE AVENUE DETROIT 2, MICHIGAN

CANADIAN CAPITOL CHAPTER

A very successful and well attended dinner meeting of the chapter was held at the Chateau Laurier. Ed Hills, Vice-president, acted as Chairman and Mr. Ross, assisted by C. Buckland and Al Snow of Railway Engineering Specialties, Ltd., Montreal, presented the educational sound films "Principles of Refrigeration," "Adjusting and Checking the Automatic Expansion Valve" and "Adjusting and Checking the Thermostatic Expansion Valve." Potts Brothers of Electric Motor Service supplied the sound projector. The Interprovincial Chapter was represented by President Gordon Roe of Montreal, and Secretary E. G. McCracken of Toronto, while the International RSES was represented by Nap Brossoit of Montreal. The door prize, an Imperial flaring and cutting tool, presented by J. St. Amour, Wholesale Refrigeration and Supplies, was won by J. McLean.

• ELM CITY CHAPTER, *New Haven, Conn., Dec. 6*—A large part of the meeting was devoted to a detailed report of the Cleveland convention by Secretary Ralph Rice. Latest statistics on the number of members, state of the treasury, etc., were presented and finally an announcement was made that the certificate examination would be held at a special meeting in the near future.

• FAIRFIELD COUNTY CHAPTER, *Fairfield County, Conn., Dec. 9*—This meeting was held in Stratford, Conn. The educational program included a demonstration of Thawzone and oil separators by Mr. Boone. An announcement was made of the second annual dinner to be held at the Fairfield Inn in Fairfield. Tickets will be $3.00 per person.

• FOX VALLEY CHAPTER, *Fond du Lac, Wis., Dec. 4*—Business of the chapter occupied the greater part of the evening. Mr. Burk, representing Gustave A. Larson Company, was the guest speaker of the evening. His subject was "Business Conditions."

• HEAD OF THE LAKES CHAPTER, *Duluth, Minn., Dec. 2*—After the normal routine of business was disposed of, the two movies entitled "Adding and Removing Refrigerant" and "Locating and Repairing Leaks" were shown. The annual election of officers followed, and those elected were Roy O. Hammerstedt, *President;* C. W. Larsen, *1st Vice-President;* Kenneth Draver, *2nd Vice-President;* Walter A. Swanstrom, *Secretary;* Eino Honkanen, *Treasurer;* and Leonard Hedin, *Sergeant-at-Arms.* Directors — Orval Hursh, William Draxton and Robert Bell.

• KANSAS CITY CHAPTER, *Kansas City, Mo., Dec. 4*—The Nominating Committee presented its report with the following recommendations for officers next year: Frank Brown, *President;* Cecil Visger, *1st Vice-President;* Robert Huston, *2nd Vice-President;* John Booi, *Secretary,* Albert Taylor, *Treasurer;* and Paul Shirley, *Sergeant-at-Arms.* Board of Directors —A. M. Hoover, M. L. Ferguson and F. C. Smith. The meeting was then turned over to Vice-president Visger who presented two films on thermostatic and pressure type refrigerator controls. Questions on the films were answered in rotation by the members.

• LA CROSSE CHAPTER, *LaCrosse, Wis., Nov. 1*—The educational films "Locating and Repairing Leaks" and "Adding or Removing Refrigerant" were shown. A new type carbonator was displayed and discussed. The discussion following the educational films included various methods of checking for leaks, the necessity of special care when removing and purging sulphur dioxide. Various problems which had confronted members were brought up and suggestions and discussion followed.

• METROPOLITAN NEW YORK CHAPTER, *New York, N. Y., Dec. 13*—Handy & Harmon Co. provided the educational feature of the evening, in the form of an illustrated lecture on the advantages of low temperature brazing alloys and their use. Six steps in the making of proper joints were demonstrated and the lecture was followed by a question and answer period.

The following men were elected to office for the next year: Fred Asselmeyer, *President;* Jack Firester, *1st Vice-President;* Bernard Krasner, *2nd Vice-President;* Morris Robinson, *Treasurer;* Donald P. Whyte, *Secretary;* Manny Parish, *Sergeant-at-Arms;* and Bernard Krasner, *Chairman of Ed.* Board of Directors—Peter Pilko, Paul Steinberg and Sterling Graves.

• MILWAUKEE CHAPTER, *Milwaukee, Wis., Dec. 3*—On the educational program, Del Albright of the Automatic Products Co., gave an interesting illustrated talk on A. P. products used in the refrigeration industry. Mr. Albright was assisted by Albert Topp.

Establishing and Developing a REFRIGERATION Service Business

A BOOK—to guide you in developing your present service facilities, or in establishing a new refrigeration service business.

IF you are now operating a business you will find the suggestions contained in this book a helpful "check list" toward better business management and operation. Whether you operate as a one-man shop, or a large service organization, there are many suggestions you can successfully employ.

IF you are starting a service business —or expanding your present refrigeration business—you need this new book because it provides factual information, based on actual experiences of those who have worked out successful plans in developing their own businesses.

There are numerous conditions to take into consideration when you start your own business or plan on expanding your present business. It is the purpose of this book to guide you in formulating a constructive program.

Subjects Covered

Advantages of Buying a Business
Average Service Charges
Be a Business Man
Convincing the Customer
Cost of Guarantee Period
Creating a Merchandise Program
Determining the Rate of Service Charge
Eight Types of Servicemen
Establishing a Budget
Financing and Credit
General Appearance of Shop
Job Cost Ticket, Letterhead and Invoice
Knowledge Needed in Commercial and Air Conditioning
Maintenance Contracts
Material and Parts Inventory
Observe Your Competitor's Line
Pointers on Business Administration
Sale of Accessories
Shop Equipment You Will Need
Shop Layout
Shop Overhead
Starting Your Own Business
Twice a Year Check-up Plan
Your Overhead

The Refrigeration Service Engineer REFERENCE MANUALS

$1.50

USE THIS ORDER

NICKERSON & COLLINS CO., Date.....
433 N. Waller Ave., Chicago 44.

Enclosed is remittance for $1.50. Send ESTABLISHING AND DEVELOPING A REFRIGERATION SERVICE BUSINESS to following address:

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CITY..... ZONE..... STATE.....

Views of the Christmas party sponsored by the Columbus Chapter. (1) Shows the members in line for refreshments; (2) shows part of the group enjoying the feed, and (3) shows part of the gifts brought by the members as their admission to the party. These gifts were sent to the Franklin County Childrens' Home to aid in brightening their Christmas.

(4) Shows some of the Board of Directors of the Columbus Chapter who are, left to right: Oscar Reese, Vic Cardosi, Howard Grossman, Secretary, Nedford Mason, Earl Yockey, President, and Harold Mohr. This group met to discuss plans for the handling of the first meeting of the Buckeye State Association of RSES.

• MONTGOMERY CHAPTER, *Montgomery, Ala., Jan. 6*—The annual election of officers took place with the following results: J. M. Manley, *President;* L. T. Williams, *1st Vice-President;* Paul Renaud, III, *2nd Vice-President;* R. M. Bedsole, *Secretary;* Wilbur E. Price, *Treasurer;* S. B. Goodwin, *Sergeant-at-Arms;* and J. B. Harris, *Chairman, Educational Comm.* These officers will be installed at the next monthly meeting.

• MONUMENTAL CHAPTER, *Baltimore, Md., Nov. 13*—"Fundamentals of Refrigeration" was the first movie of the evening, followed by three entertaining sound films on sports events.

Much of the December 11th meeting was devoted to entertainment features in connection with the annual Christmas party. Business was dispensed with, with the exception of voting upon some resolutions to be passed. Mr. Yamin was introduced by the Entertainment Committee, who immediately took charge of the meeting. With necktie chopping, asking ladies to partially disrobe (at least to removing their stockings), giving half of the assets away for nothing, and training guys how to put a hat on the other guy's head, it leads one to believe that this service engineer, at least, should be promoted for a big job with the gang at Washington. But the "Human Auctioneer" got a lot of laughs. After there was nothing more to give away, everybody resorted to the old custom of partaking of plenty of good food, a juke box made its appearance and several had a good time dancing with the other guy's girl.

• NIAGARA CHAPTER, *Buffalo, N. Y., Dec. 22*—The second annual Christmas party was held on this date, which proved to be a very enjoyable occasion. The feature entertainment included a marionette show and Santa Claus (member Leon McCormick) had a bounteous alluring cellophane bag of hard-to-get colorful candy for each and every child. Officers and members of the chapter, in cooperation with Auxiliary members, were responsible for the party which turned out to be such a gratifying success.

• OIL CAPITOL CHAPTER, *Tulsa, Okla.*—Newly elected officers of the chapter are: E. P. Epps, *President;* John Egger, *Vice-President;* D. G. Andrews, *Treasurer;* E. L. Lanning, *Secretary;* and Ted Baker, *Sergeant-at-Arms.*

• ONTARIO MAPLE LEAF CHAPTER, *Toronto, Ont., Nov. 15*—P. O. Domke of Mueller Brass Co., Port Huron, Mich., was the speaker of the evening on the subject of dryers, filters and heat exchangers, their proper application and purpose. Cut-away samples served to illustrate the construction.

C. H. Anderson, of Wagner Electric Co., was the speaker at the December 20th meeting. Mr. Anderson talked on the subject "New Standards for Fractional Horsepower Motors as Established by National Electrical Manufacturing Association in the United States."

Let's Talk About COMMUTATORS!

1 Wagner Knows Commutators

Since Wagner introduced the first commercially successful single-phase motor in 1896, the company has manufactured millions of commutators for repulsion-start induction brush lifting motors—far more than any other manufacturer.

2 Wagner Builds Commutators That Last

An almost unlimited number of full-load starts is built into every Wagner commutator. Liberal design provides extra strength, permits refacing several times, if necessary, with safety. Replacement commutators are built to operate at any speed up to and including 3600 RPM without danger of "explosion".

3 Wagner Builds Commutators That Fit

Genuine Wagner replacement commutators are built as an original motor part—your assurance of an accurate all-around fit for correct operation. Segments are accurately milled to facilitate connection of rotor leads.

4 Avail Yourself of Wagner's Experience

Wagner replacement commutators, like all genuine Wagner parts, bring you the benefit of the latest improvements in materials, design and construction.

Commutators Are Available For Immediate Delivery

Wagner motors are world-famous for dependable service. When repairing a Wagner motor, be sure to use *genuine* Wagner motor parts, designed and built to renew that dependability. Get them from one of the 325 authorized service stations displaying this sign.

Every motor repair shop needs this catalog. It helps you determine the catalog number and price of Wagner fast-moving motor parts. Write for Catalog MU-40 today.

M46-25A

Wagner Electric Corporation

EST. WE 1891

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● PENINSULA CHAPTER, *Newport News, Va., Dec. 12*—Upon completion of the business session, Mr. Israel of Virginia Smelting Co., gave a lecture on principles of refrigeration, including compression and absorption systems. His talk was supplanted by sound motion pictures and projected slides on which considerable discussion arose. Following the lecture, Mr. Israel passed out booklets on the properties of various refrigerants, pressure temperature relationship cards and other useful information.

● SAN DIEGO CHAPTER, *San Diego, Calif., Dec.*—Newly elected officers of the chapter are M. R. Hanks, *President;* Wm. J. Fickler, *Vice-President;* W. E. Gille, *Secretary-Treasurer;* and M. C. Wampler, *Sergeant-at-Arms.* Board of Directors—R. G. Romick, A. P. Hoine, O. Williamson, W. L. Stelzer and F. C. Cleaver. M. R. Hanks is an exceptionally fine choice for the leading post in the chapter. He has long been an active member and has served in one office or another since 1940. He served from 1940 to 1941 as Secretary of the chapter and was returned to office as Treasurer for the 1942 to 1943 term. He again served as Secretary and Treasurer during the years 1944 and 1945. He did an exceptionally fine job of the secretarial work and has perhaps the broadest understanding of the chapter's needs and administration.

● SHREVEPORT CHAPTER, *Shreveport, La., Nov. 14*—The entire evening was devoted to organizational problems in which was included the adoption of the By Laws and Constitution as set down by the International Society. The election of temporary officers, to serve until such time as the charter was presented, included M. W. Finuf, *President;* D. M. Boggs, *Secretary;* and H. H. Austin, *Treasurer.* Meeting nights were set as the third Thursday of each month.

● SOUTHERN OHIO CHAPTER, *Portsmouth, O., Dec. 10*—Officers for the following year were elected to serve the chapter. They are George P. Kaut, *President;* Ralph Layton, *Vice-President,* Forrest D. Poole, *Secretary;* Earl Minch, *Treasurer;* and Herbert McAdams, *Sergeant-at-Arms.* Directors — Carl Bussel, Carl Ackley, Francis Overman, Raymond Steiner and Howard Journey.

Members voted during the meeting to become affiliated with the Buckeye State Chapter and elected Forrest D. Poole as their delegate for the next two years.

● SPRINGFIELD, MO., CHAPTER, *Springfield, Mo., Dec. 18* — 45 members and their wives attended this meeting, held at Yoachum's Grill. This was the annual banquet meeting, followed by entertainment. Music for the evening was furnished by the Music Department of Drury College, and the after dinner speaker was Jack Powell, a young attorney in the city.

● SUNSHINE CITY CHAPTER, *St. Petersburg, Fla., Dec. 3*—The meeting was held at the Florida Power Annex, and after a short business session, one of the films provided by the International Society was shown and the discussion period on the slides to follow occupied more than an hour. Plans were discussed for a dinner meeting to be held at the next meeting date.

● TWIN CITIES CHAPTER, *Minneapolis, Minn., Nov. 5*—Earl Jennings and J. H. Cohler of the Temprite Corp., provided the entertainment feature of the evening, in which Mr. Jennings explained the operation of Temprite coolers and their service problems. Following the meeting, the ladies auxiliary joined the men in viewing motion pictures of the last two annual picnics.

Officers of the chapter were elected at the December 3rd meeting. They are Ed Asproth, *President;* George T. Gartner, *Vice-President;* William Manke, *2nd Vice-President;* Milton Swanson, *Treasurer,* William Hanson, *Secretary;* and Hubert Hanson, *Sergeant-at-Arms.* Board of Directors—Eugene Coulter, Harry Schaffer and Lester Ost.

● WICHITA CHAPTER, *Wichita, Kans., Dec. 5*—The annual election of officers took place at the annual banquet of the chapter, held on this date. The officers elected were Harold E. Shannon, *President;* Paul Whitman, *Vice-President;* Merle K. Hawkins, *Secretary-Treasurer;* and Howard F. Muck, *Sergeant-at-Arms.*

● WORCESTER CHAPTER, *Worcester, Mass., Nov. 19*—In the words of the Secretary, "After the exodus of the tradesmen, from masons to steamfitters, the residue was named the permanent quarters of our chapter. Through the courtesy of "Bob" Sheperdson of Standard Supply, the second floor of his building is now our home. We appreciate what one of our members has done for all. The job that remains is to augment our library that includes issues of THE REFRIGERATION SERVICE ENGINEER for the past eight years, plus service and sales manuals from advertisers in our magazine. So far, all parties have been most cooperative and our thanks to them. We have charts, diagrams, bulletins and even samples of various products. "Tony" Jakstis won't be satisfied until our library includes the living model from "Peerless." Wow — would that give 100% attendance.

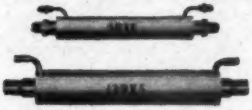
"Until further notice, we can brag that we have the largest ash tray of any chapter. The tenants walked on it all night. Maybe our landlord and the Fire Department have other plans. Because our temporary entrance is through Standard's stockroom, we left the meeting with hands overhead, subject to the X-ray eyes of Marshall Lewis and Sam Saltus. If their inventory is out this month, let us consider ourselves evicted and report next meeting to our usual hired hall. For brain food, the officers presented Paul Nicholas and W. T. Lydstone of Ideal Industries, who showed the most modern method of soldering."

Ladies Auxiliary

● KANSAS CITY AUXILIARY, *Kansas City, Mo., Dec. 4*—The annual election of officers held this date, resulted in the following: Mrs. Ruth Ferguson, *President;* Mrs. Maxine Haller, *Vice-President;* Mrs. C. R. Visger, *Secretary;* Mrs. A. M. Hoover, *Treasurer;* Mrs. A. C. Taylor, *Sergeant-at-Arms.* Board of Directors—Mrs. Frank Brown, Mrs. E. L. Tramposh and Mrs. Katharine Anderson.

● TWIN CITIES AUXILIARY, *Minneapolis, Minn., Jan. 3*—Mrs. Boardsley gave the Nominating Committee report, after which the election of officers was held with the following results: Mrs. Holmes, *President;* Mrs. Hanson, *Vice-President;* Mrs. Schwarting, *Secretary;* Mrs. Asproth, *Treasurer,* and Mrs. Taylor, *Sergeant-at-Arms.*

MINIMUM PRESSURE DROP *with* HEAT-X CAST ALUMINUM HEAT EXCHANGERS



Shown are two models of Heat Exchangers—various sizes available. Both liquid and suction are copper tube. Ideal for use as water cooled capacity boosters on air cooled units. No internal joints—no by-pass.

MORE BTU's PER WATT *with* HEAT-X CAST ALUMINUM LIQUID COOLERS

Here is one of Heat-X Coolers you can select from a range of sizes.

No freeze-up damage and no short cycling are two outstanding features. These Coolers combine top performance and low cost.

WRITE AT ONCE FOR HEAT-X ENGINEERING SPECIFICATIONS AND CAPACITY TABLES

Orders Promptly Shipped

THE HEAT-X-CHANGER CO., INC.

115 Lexington Avenue, New York 17, N. Y. Brewster, New York

LEAKY TERMINALS

ON ALL

SEALED CROSLEY F-12 UNITS

EASILY REPAIRED IN A FEW MINUTES WITHOUT OPENING THE COMPRESSOR

SET OF THREE TERMINALS (PART NO. 1020).....$6.75

INSTALLATION TOOL (PART NO. 23051).....$1.65

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FLOAT REPLACEMENTS

Part No. 2000—Westinghouse (4 hole mounting plate).
Part No. 2010—Westinghouse (3 hole mounting plate).
Part No. 2020—Gibson.
Part No. 2030—General Electric (monitor top models DR-1 and DR-2).
Part No. 2040—For general replacement (with undrilled mounting plate).

These parts are used to replace defective high side floats on household units. They have regular charging set connection, cap tube setup, internal strainer and exact mounting plate. Solid brass construction—neat appearance. Quickly and easily installed. Each.....$6.75

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IMMEDIATE DELIVERY — MONEY BACK GUARANTEE

Order Through Your Supply Wholesaler or Write Direct. Write for Bulletin No. 14 Listing Other Sealed Unit Parts.

LOOK IN THE NEXT MONTH'S ISSUE FOR OTHER SEALED UNIT PARTS

SEALED UNIT PARTS CO.

3097 Third Ave. New York 56, N. Y.

Educational Sound Films Schedule of Showings

UNDER the supervision of the International Educational Committee, a set of 16 sound films, grouped into 12 showings and accompanied by a set of slides, are being circulated among chapters as a part of their educational program. Films are all of a practical nature on servicing refrigerating systems. Titles of the films and their identifying numbers and the schedule of showings are listed.

Film Titles and Key Numbers

No.	TITLE
360	Principles of Refrigeration
438	Checking The System—Part I
439	Checking The System—Part II
440	Locating and Repairing Leaks
441	Adding or Removing Refrigerant
442	Removing and Installing A Compressor or Condenser
443	Removing and Installing A Cooling Unit
444	Adjusting and Checking The Expansion Valve
445	Checking and Replacing A Float Valve
446	Checking The Electrical System
447	Quieting A Noisy Refrigerator
448	Adjusting and Repairing The Thermo-Expansion Valve
451	Servicing Water Cooled Condensers
449	Adjusting Pressure Actuated Temperature controls
450	Adjusting Commercial Thermostatic Controls
452	Making and Repairing Tubing Connections

SCHEDULE OF SHOWINGS

AKRON, OHIO—Akron Chapter: February 12—No. 443. Contact Claude L. Wall, 23 Grand Ave., Akron 2, Ohio.

AURORA-ELGIN-JOLIET, ILL. — Tri County Chapter: January 18—No. 448-451—February 15—No. 449-450. Contact William J. McCarley, 607 N. Center St., Joliet, Ill.

BALTIMORE, MD. — Monumental Chapter: February 11—No. 438-439. Contact Mr. George J. Roche, Roche & Hull Appliance Corp., 1029 Cathedral St., Baltimore 1, Md.

BATON ROUGE, LA. — Louisiana Chapter: February 7—No. 449-450. Contact Mr. A. E. Kaiser, Sr., Acme Refn. Service Co., 1670 North St., Baton Rouge, La.

CHARLESTON, W. VA.—Charleston Chapter: February 11 — No. 448-451. Contact H. G. Frame, 1105 Washington St. W., Charleston 2, W. Va.

CHICAGO, ILL.—Chicago Chapter: February 11—No. 452. Contact D. D. Orr, 332 S. Hoyne Ave., Chicago, Ill.

CLEVELAND, OHIO — Cleveland Chapter: February 11—No. 444. Contact Robert Whitney, % Williams & Co. Inc., 3700 Perkins Ave., Cleveland 14, Ohio.

COLUMBUS, OHIO—Columbus Chapter: February 12—No. 452. Contact H. Grossman, 22 W. Naghten St., Columbus, Ohio.

DENVER, COLO.—Mile High Chapter: January 20—No. 449-450—February 17—No. 452. Contact R. C. Kimmel, 1524 15th St., Denver 17, Colo.

DUBUQUE, IOWA—Key City Chapter: February 5—No. 452. Contact Stampfer Farm & Home Store, Attn. Mr. R. E. Mueller, 7th & Iowa, Dubuque, Iowa.

DULUTH, MINN.—Head of the Lakes Chapter: February 3—No. 442. Contact C. A. McCafferty, 7 N. 29th Ave., W. Duluth, Minn.

EVANSVILLE, IND. — Evansville Chapter: January 30—No. 448-451. Contact C. E. Goad, 11 Main St., Evansville, Ind.

FLINT, MICH.—Motor City Chapter: February 11—No. 444. Contact Mr. Dave Fortune, 413 North Chevrolet Ave., Flint, Mich.

FORT WORTH, TEXAS—Cow Town Chapter: February 13 — No. 448-451. Contact P. D. Cato, Texas Refn. Supply Co., 1410 Commerce St., Fort Worth, Texas.

FRESNO, CALIF.—Fresno Chapter: February 13—No. 446. Contact N. N. Leas, % Cond. Air & Refn. Co., 249 N. H St., Fresno 3, Calif.

GRAND RAPIDS, MICH. — Furniture City Chapter: February 4—No. 452. Contact M. D. Thiebout, % Consumers Power Co., 450 Market St., S. W. Grand Rapids, Mich.

HARTFORD, CONN.—Central Conn. Chapter: January 27 — No. 445. Contact Stanley H. Baldwin, % Joseph Simons Co., 271 Sheldon St., Hartford, Conn.

HUNTINGTON, W. VA.—Tri State Chapter: February 11 — No. 449-450. Contact A. W. Albertsen, 314 11th St., Huntington 14, W. Va.

INDIANAPOLIS, IND.—Indianapolis Chapter: February 11—No. 443. Contact J. A. Salter, 3623 E. Michigan St., Indianapolis, Ind.

JACKSON, MISS. — Magnolia Chapter: January 22—No. 444. Contact A. E. Shafer, P. O. Box 1509, Jackson 112, Miss.

LA CROSSE, WIS.—La Crosse Chapter: February 7—No. 442. Contact George Brenstein, 408 Copeland Ave., LaCrosse, Wis.

LANSING, MICH.—Wolverine Chapter: January 27—No. 452. Contact R. Kellogg, 616 Jessop Ave., Lansing, Mich.

LIMA, OHIO — Lima Chapter: January 16 — No. 445—February 20—No. 446. Contact Allied Supply Co., Attn. Dan Shively, 122 S. Union St., Lima, Ohio.

LOGAN, UTAH—Utah Aggie Chapter: January 23—No. 438-439—February 5—No. 445—February 19—No. 448-451. Contact J. Cecil Sharp, % Utah State Agricultural College, Logan, Utah.

LONG BEACH, CALIF. — Long Beach Chapter: February 12—No. 447. Contact L. K. Willis, Willis Refn., 1110 E. Broadway, Long Beach, Calif.

LOS ANGELES, CALIF.—Los Angeles Chapter: January 29—No. 446. Contact Merle F. Stutzman, 3464 West First St., Los Angeles 4, Calif.

LOUISVILLE, KY.—Colonels Chapter: January 16—No. 440-441. Contact J. M. Berry, % F. H. Lagsenkamp Co., 339 W. Main St., Louisville 2, Ky.

MARION, IND. — Central Indiana Chapter: February 19—No. 443. Contact Francis Holloway, 704 Whites Ave., Marion, Ind.

MEDINA, OHIO—Medina Chapter: February 10—No. 444. Contact Orra Nichols, Jr., Nichols Elecl. Equipment Co., Route 1, Medina, Ohio.

THERMO-BANK

automatic defrosting

Means:

LOWER TEMPERATURES
HIGHER EFFICIENCY
HIGHER HUMIDITY
ATTENTION-FREE OPERATION

With the Thermobank, temperatures of 32° F. to -40° F. and below can be maintained as easily and with the same freedom from frost as temperatures of 40° F. in a conventional system. Operating with practically frost-free coils, Thermobank maintains the desired low temperatures with higher back pressures, less temperature differential between air and coils; and consequently higher humidity, less drying and more efficient compressor operation.

Essentially, the Thermobank System of Automatic Defrosting consists of a forced convection cooling unit, automatic time controls and a heat reservoir. A portion of the heat extracted during the refrigeration cycle is banked in the reservoir from which it is released to the refrigerant during the defrost cycle.

14

Send for Booklet 16-RS explaining Thermobank System and including useful low temperature information and time-saving rapid selection tables.

"IT'S THE COILS THAT COUNT" specify KRAMER

KRAMER TRENTON CO.
HEAT TRANSFER EQUIPMENT
TRENTON 7, NEW JERSEY

NO RUN-IN TIME

On the

NEW

Arlington SHAFT SEALS

Simply install and the job is done. Save half an hour on each seal replacement job. Installation is simple and easy even when the shaft is slotted, undercut, pitted or corroded.

Precision finished—not to thousandths but to *millionths* of an inch.

Available at better jobbers or write for full information on

The New

Arlington SHAFT SEAL

MODERN DESIGN PRODUCTS CO.
3944 W. LAKE ST. - CHICAGO 24, ILLINOIS

MIAMI, FLA.—Greater Miami Chapter: January 23—No. 446. Contact Orville W. Brown, 1044 N. W. 65th St., Miami 38, Fla.
MONTGOMERY, ALA. — Montgomery Chapter: January 20—No. 448-451—February 17—No. 449-450. Contact W. C. Goodwin, 8 Forest Ave., Montgomery, Ala.
NEW HAVEN, CONN. — Elm City Chapter: February 7—No. 447. Contact T. B. Howell, United Illuminating Co., 221 George St., New Haven, Conn.
OMAHA, NEBR.—Mississippi Valley Chapter: January 16—No. 449-450—February 20—No. 447. Contact C. M. Flohr, % United Motors Service, 27th Ave. & Harney St., Omaha, Nebr.
PEORIA, ILL.—Illinois Valley Chapter: February 14—No. 447. Contact Bryson Roth, 300 S. Washington St., Peoria, Ill.
PENSACOLA, FLA.—Pensacola Chapter: February 4 — No. 360 — February 18 — No. 442. Contact Willie Fillingim, 518 E. Zarogossa, Pensacola, Fla.
PORTLAND, ORE. — Multnomah Chapter: January 16—No. 445—February 20—No. 446. Contact Wayne C. Miller, % Minneapolis Honeywell Regulator Co., 122 N. E. Broadway, Portland, Ore.
READING, PA. — Reading Chapter: January 23—No. 447—February 20—No. 448-451. Contact O. A. Larson, % Larson Supply Co., 326 Buttonwood St., Reading, Pa.
ROCKFORD, ILL.—Rockford Chapter: January 20—No. 452. Contact L. L. Sturch, 1915 Vernon St., Rockford, Ill.
ST. PETERSBURG, FLA. — Sunshine City Chapter: February 4—No. 446. Contact R. B. Schroeder, Florida Power Corp., St. Petersburg 1, Fla.
ST. LOUIS, MO.—St. Louis Chapter: January 21—No. 438-439—February 18—No. 440-441. Contact Adolph Braun, 4226 Lafayette St., St. Louis, Mo.
SALT LAKE CITY, UTAH—Beehive Chapter: January 30 — No. 449-450. Contact W. W. Walker, % G. E. Supply Corp., 310 W. 2nd South St., Salt Lake City, Utah.
SAN DIEGO, CALIF. — San Diego Chapter: January 16—No. 446—February 20—No. 447. Contact C. E. Anderson, 209 West E St., San Diego 1, Calif.
SAN FRANCISCO, CALIF. — Golden Gate Chapter: January 23—No. 445. Contact Ray Winther Co., Attn. George N. Eskra, 1245 Folsom St., San Francisco 3, Calif.
SANTA ANA, CALIF.—Orange County Chapter: January 16—No. 444—February 20—No. 445. Contact R. L. McCain, 615 E. Bishop St., Santa Ana, Calif.
SCRANTON, PA.—Scranton Chapter: February 5—No. 445. Contact W. D. Franklin, 1632 Sanderson Ave., Scranton 9, Pa.
SPRINGFIELD, MASS.—Western Mass. Chapter: January 28—No. 447. Contact Harold C. Lambert, Room 449—31 Elm St., Springfield 3, Mass.
SPRINGFIELD, MO.—Springfield Mo. Chapter: January 29—No. 442. Contact Hoffman Supply Co., 810 Boonville, Springfield, Mo.
TOLEDO, OHIO — Greater Toledo Chapter: February 12—No. 447. Contact Paul D. Sizer, P. O. Box 69, 1216 Adams St., Toledo, Ohio.
TRENTON, N. J.—Trenton Chapter: January 15—No. 442—February 19—No. 443. Contact Harry H. Jaeger, 216 S. Warren St., Trenton, N. J.
TULSA, OKLA. — Oil Capitol Chapter: January 29—No. 452. Contact K. G. Wight, % K & M Supply Co., 208 N. Denver, Tulsa 3, Okla.
WATERLOO, IOWA—Cedar Valley Chapter: January 22 — No. 443. Contact Mr. James Adams, % Herbert Refrigeration, 719 Lafayette St., Waterloo, Iowa.
WATERBURY, CONN.—Waterbury Chapter: February 5—No. 442. Contact A. M. Barbiero, % The Naugatuck Dairy I. C. Co., 34 N. Main St., Naugatuck, Conn.

RECORDING SERIAL NUMBERS

(Continued from page 52)

all fixtures such as "1-Walk-in cooler. 2-Display cases."

Enter the refrigerant used in the system and the date the equipment was installed on the fourth line. Even where the equipment was not installed by you it would be helpful to obtain an approximate date of installation from the owner so that your records will show an approximate age of the equipment.

On the fifth line enter the cut-in or cut-out temperature or pressure and the temperature of the air, fixture, brine or water that is being cooled by the evaporator.

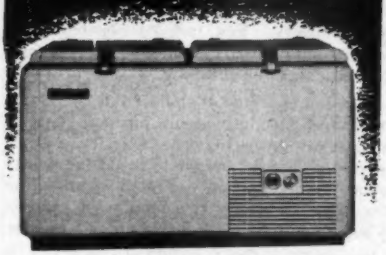
List of Components

In the spaces provided in the bottom half of the card, list all the major components of the system, along with their make, model number and serial number. For example, a list for a small meat market may appear as follows: 1—condensing unit, 1—1½ hp. motor, 1—display case, 1—walk-in cooler, 1—fan coil, 2—fin coils, 2—T.X.Valves, 1—pressure control. The space for "remarks" may be utilized to note the fixture containing the fin coils or the fan coil, any irregular appearance or condition of the component, location of the condensing unit and other useful information.

In general the card is intended to provide a complete and condensed description of the installation and all essential data which would enable the service company to order parts and identify equipment without the necessity of another call on the customer's premises.

The reverse side of the card could be ruled for the service record of the installation, and in this record would be noted any replacement of a major part. However, it would also be necessary to change the model and serial numbers on the original record to comply with the identification of the replacement.

LOOMING **BIG**
IN THE MODERN AMERICAN LIVING SCENE . . .



. . The **BEN-HUR**
Farm & Home Freezer

Engineered and designed to bring the health-building benefits of fresh-frozen foods to the rank and file of better-living conscious Americans. Hundreds of thousands of new homes now planned and building are present prospects for a generous-size, dependable, quality-built BEN-HUR Farm and Home Freezer.

Service-wise dealers, anticipating increased customer good-will and confidence will feature and recommend the new "BEN-HUR" for these "Stand-Out" Quality Features.

★ ALL STEEL CONSTRUCTION
★ LIFETIME TESTED
★ ALL FOOD SURROUNDED BY COLD
★ A SIZE FOR EVERY FAMILY
★ THICK INSULATION (Hermetically Sealed)
★ MODERN, SMART DESIGN
★ ECONOMY-ENGINEERED

BEN-HUR MFG. CO.
Continuous Manufacturing Since 1911
634 E. Keefe Ave. Dept. RS Milwaukee 12, Wis.
BEN-HUR FARM & HOME FREEZERS

HOW MANY METER-MISERS IN YOUR AREA "NEED GAS"?

Have you been allowing your competitor to get all this Frigidaire service because you have had no refrigerant?

Efficient service demands a stock of replacement parts for immediate use. Just as important is your supply of—

HERVEEN

the IDEAL REPLACEMENT GAS

Meter-Miser Service is no different than the servicing of other units of similar design. . . . The main "bottle-neck" has been in the supplying of the original refrigerant. HERVEEN makes efficient service and satisfactory operation possible.

Send for our bulletin on "Procedure for Recharging Meter-Misers with HERVEEN."

For deliveries, see your local jobber or write to

Conservative Gas Corp.
Modern Gas Division
MANUFACTURERS & REFINERS
1084 BEDFORD AVE.
Brooklyn 5, New York

AIR CONDITIONING SYSTEMS

(Continued from page 38)

of refrigerant taken, and the system prepared for service. A final set of measurements should be made and recorded in the form illustrated in Fig. 6.

All equipment and workmanship should be checked for completeness and the premises left in a neat and orderly manner.

Service gauges should be removed, port plugs and valve caps installed and tightened, damper quadrants retightened, and belts should be rechecked and tightened, as required.

In order to check the results of the dehydration, samples of Freon gas should be taken and forwarded to a laboratory for moisture analysis.[1]

As a final step the maintenance personnel of the user should be instructed in the proper operation and service of the complete installation. You might also securely fasten, on or near the equipment, an instruction card containing information necessary for minor maintenance functions and giving your name and telephone number as a source for normal and emergency service.

(Concluded)

RAISING PRICES

(Continued from page 39)

Maybe it is 20%. Maybe it is 50%. Whatever it is, the following method is applicable:

A—What was your profit before your volume was reduced? If it was 30%, put it down as 0.30	0.30
B—Add 1 to A	1 + .30 = 1.30
C—What is the reduction in volume? If it is 10%, put it down as 0.10	0.10
D—Multiply B by C.	1.30 × .10 = 0.13
E—Subtract D from 1	1 — .13 = 0.87
F—Divide A by E	.30 ÷ .87 = .34

That's the method. The answer, as in the table above, is 34%. Now try this one yourself in order to make certain that you have learned how to apply the above "method": If your normal profit is 50% and your reduced volume is 20%, what must your profit be on the remaining 80% of volume, based on cost?

The answer is 72%. Did you get the answer? Next, if you worked it out correctly, apply the method to your own business and your own conditions.

GETTING DOWN TO BUSINESS

(Continued from page 41)

reader when time counts so much these days—words that put your reader into a mental fog and keep him there.

As you write a business letter, for whatever purpose you have in mind, remember that you are dealing with a fellow human being at the other end of the mail. He wants to get to the point and to understand you as quickly and easily as possible.

There's no need to use a ten-dollar word when a simple one will do. There's no need to be flowery. You can be courteous, of course, but stilted, roundabout language only obscures the meaning.

Here's a tip—and it's one from the heart, for I feel strongly about business letters. As you sit down to write a letter, talk it "out loud" before you write it. If the words sound "funny" to you—affected—you can be sure they are going to sound even funnier to the other fellow. A letter doesn't require a particular literary technique. A letter is YOU—at least, it's you on paper. Write your letter as if you were actually talking to the other fellow, as if he were sitting right across the desk from you. Would you start out the conversation with "I am desirous of" or would you say "I want"?

Because your letter is YOU on paper, you want to impress the other fellow with the fact that you are modern, intelligent, clear-headed. So be yourself in your letters—of course, slang and swear words are out. Certainly, common, but not flowery, courtesy is to be expected.

And get to the point in your letter. Waste no time on anything but the subject matter in question. Your correspondent will appreciate your economy of words. He hasn't the time to wade through an essay either.

Above all, don't let letters "scare" you, as they do so many fellows. Use short, uninvolved sentences and ten cent words instead of the more elaborate ones. Smaller words take less time spelling and less time reading, and there are enough of them around to help you say anything you will ever have to say.

In business letter writing, as well as in any business relationship, remember the old saw, there's a "U" and an "I" in the word "business." Don't ever forget that business is a meeting between people, not between machines. And keeping your letters "HUMAN" is GOOD business!

LEAKS?

Find them with

VISOLEAK

VISOLEAK detects even the smallest leaks before they cause damage to expensive refrigeration systems. Years of use prove it safe, economical, easy to use.

NEW CHARGING SET

The VISOLEAK Charging Set was developed to inject VISOLEAK, add refrigerant oil, or recharge sealed units. For use on all types of refrigeration systems without danger of introducing air or foreign matter.

Charging Set—complete with hoses . $7.50
Filler only—without hoses 6.00

WHOLESALE PRICES		CASE LOTS
4 ounce bottle.	$ 1.00	48 bottles
8 ounce bottle.	1.75	24 bottles
1 pint bottle...	3.00	24 bottles
1 quart bottle.	5.00	12 bottles
1 gallon can...	16.00	6 cans

SAVE 10% ON CASE LOTS

See your refrigeration supply jobber or write for complete information.

WESTERN THERMAL EQUIPMENT COMPANY

1701 West Slauson Avenue Los Angeles 44, Calif.

CONTROLS—VALVES

REPAIRED OR EXCHANGED

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New ATTIC FAN TIMER by Paragon

HERE'S a new member of the Paragon family . . . the AF Series for timing attic and window fans.

Entirely new in design, this timer is offered in two time ranges, 0-10 hours and 0-20 hours, each fully adjustable to any position on the dial . . . a real convenience for the user.

Equipped with a quiet Telechron motor and an improved switch, the timer is rated for high capacity, and will handle a ½ HP motor. Beautifully finished drawn aluminum case, anodized, with dial and pointer protected by clear Plastacele.

Underwriter approved, all electric, no springs, mounts easily to Handy box or single gang switch box, or may be surface mounted with conduit connections into the bottom of the timer. The setting may be changed at will without harming the instrument. Timer motor runs only when timer is actually in operation.

AT ONLY $9.75
AN OUTSTANDING VALUE

Get your orders to your jobber—now and start planning installations early. Complete data sheet on request.

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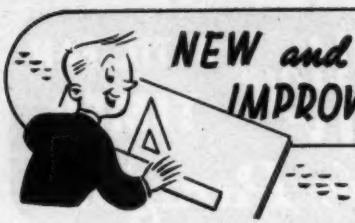


NEW and IMPROVED EQUIPMENT

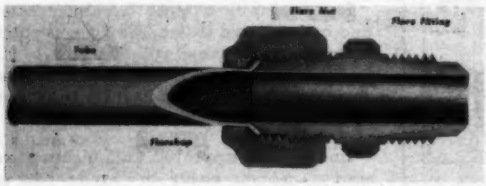
Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

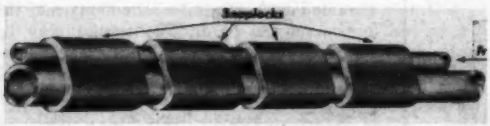
Flarekops and Snap Locks

TWO new products of Flow Controls, Inc., Chicago, Ill., have been recently announced. The first, "Flarekops" is designed as a replaceable seat for flare tube connections. To the fingernail and the eye the surfaces of both the seat and fittings of flare tube connections may seem very smooth. Actually, under a microscope, most surfaces are very rough with a multiplicity of scratches, pebblings, etc. As we assemble such rough surfaces together, the inter-engaged rough surfaces tend to chew up under the combined action of pressure and rotation.

If all the surfaces were of equal roughness and hardness, the flare nut would turn as readily on the outer flare surface of the tube, as the inner flare surface of the tube would turn on the flare seat of the fitting.

Actually, the flare nut being generally a brass forging and the flare fitting being generally made of brass bar stock, the flare fitting is the harder of the two. In consequence, as we tighten up the various components, the tube flare tends to rotate upon the fitting flare seat while under pressure. If the assembly is taken apart and viewed, the flare seat surfaces under a microscope will be found to have a roughness much greater than before the original assembly. In fact, it is surprising how such surfaces could be leak free. Many such joints can again be made leak-proof, but this is accidental and very often presumptive, since there is no positive method to detect very small leaks. Small leaks generally grow into a large leak, and the only safe method, is to be sure of no leak at all at the start. This is where Flarekops used on all flare joints serve their purpose.





Flarekops come in quantities strung on safety pin type wire hanger, and are available in all tube sizes from ¼" to ⅜".

Another product of the Flow Controls, Inc., is the Snap Lock, a liquid to suction line heat exchange clamp. It is common refrigeration practice to fasten both suction and liquid line together for a considerable distance in order to form a heat exchanger. The ordinary method of doing this is to solder the two lines together, but soldering is usually a messy, time consuming job of poor appearance and low efficiency due to the poor heat conductivity of the solder.

With the Floco Snap Lock, all you do is to parallel the liquid and suction lines, taking out any real sharp kinks and then snap 50 of the Snap Locks into position as shown here. Tests prove that 50 Snap Locks are as effective as 96 inches of the usual soldering. The Snap Locks can be placed any place where the liquid and suction lines parallel. If you do not have room for 50 Snap Locks, which take up 50 inches when placed close together, although they may be spaced apart slightly if you so desire, use as many as you can, bearing in mind that the more you use the greater the efficiency increase.

Snap Locks are made in four size combinations of liquid lines and suction lines. They accommodate liquid lines from ¼" to ⅜" and suction lines from ½" to ¾".

A-P Water Valve

PROMISING more accurate control of water flow to water-cooled condenser units, and protection against troubles due to dirt and lime in water, an improved water regulating valve, the A-P Model 68-B, recently put into production, shows several unique features. Its manufacturers, Automatic Products Company, Milwaukee, Wisconsin point out that it differs radically from the conventional valve design, particularly in the construction and operation of its valve stem and seal.

The new A-P Model 68-B Water Regulating Valve employs a molded composition seal on the valve stem, instead of the ordinary type of needle and seat. This seal moves across the polished

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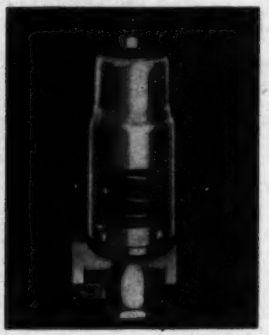
mirror-smooth stainless steel seat, to provide a self-cleaning "wiping" action which avoids common troubles due to dirt and lime in the water. Because of this construction, the valve seat need not be replaced as in other valves. Laboratory tests in sandy water covering the equivalent of many years of actual field use show no sign of wear on either the sliding seal or the stainless steel seat, indicating a "lifetime" of dependable service.



The unusually long stroke provided by this unique valve design assures closer, more uniform control. Water flow to the condensing unit is regulated by means of head or receiver pressure which actuates a heavy duty bellows in the top of the valve, which, in turn, moves the sliding valve stem and seal. Direct-through flow construction reduces the pressure loss to a minimum. Chattering, and water-hammer are positively eliminated. Because of a restricting head pressure inlet orifice, compressor pulsations cannot affect the action of the valve. A special "O" Ring seal used to prevent leakage at the valve stem is the same type proved during the war in high pressure hydraulic use.

The new A-P Model 68-B Water Regulating Valve has an operating head pressure range of 50 to 150 psi. Adjusting nut is easily accessible, and a drain plug at the base permits valve flushing when necessary. Available in three sizes, ⅜", ½" and ¾" inlet and outlet, it may be used on Freon, Methyl Chloride, or Sulphur Dioxide Systems. Further details may be obtained in a bulletin offered by the manufacturers, Automatic Products Company, 2454 North Thirty-Second Street, Milwaukee 10, Wisconsin.

Fan Timer

THE popularity of attic and window fans for ventilating and cooling during the summer months is steadily increasing. Much of the favor for this method is due to the availability of new electric timing devices, enabling the home owner to set his fan timer for any pre-determined period of operation.

In its new AF (Attic Fan) series, Paragon Electric Company announces two models of a synchronous motored Attic Fan Timer, capable of presetting for any period to 10 or 20 hours respectively by 10 or 20 minute intervals.

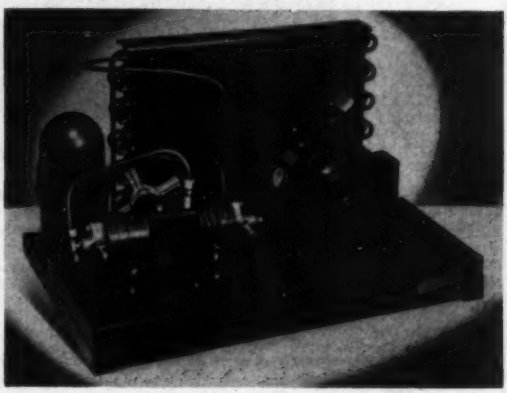
Quiet, dependable, and accurate in operation, the timer is designed to open the fan circuit thus turning off the fan, at the end of the preset period. Thus the user may set the switch before retiring, and his fan will cool the house through the night for any specific time interval.

Completely electric, and powered by Telechron self-starting synchronous motors, these timers will give years of trouble-free service.

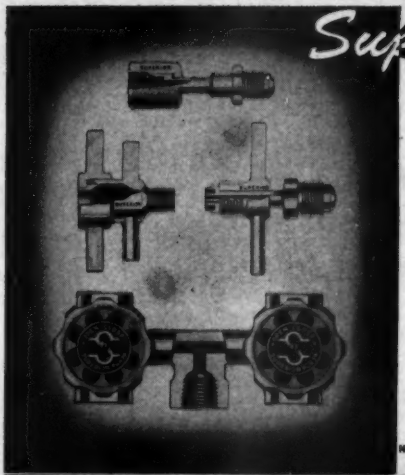
Underwriter Laboratory approved for 24 volt or 115 volt alternating current, will operate any A.C. fan. Clock motor runs only when timer is in operation.

Designed for surface mounting with conduit connection at bottom, or direct to handy box. For further data and prices write Paragon Electric Co., 1636 Twelfth Street, Two Rivers, Wisconsin.

Two-Stage Condensing Unit



Controldtemp Corporation, Brooklyn, New York, is distributing a new package type, ½ horsepower, two-stage condensing unit. This midget is adaptable for a wide variety of appliances including frozen food cabinets, reach-ins and showcases. Immediate delivery of these units is being made by the Controldtemp Corporation, 236 Butler Street, Brooklyn 17, New York.



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QUICK-COUPLERS

Exactly what the name implies—handy little swivel connectors for "quick-coupling" charging lines, gauge lines, vacuum lines, pressure lines, etc. to refrigeration cylinder valves, gauge sets, compressor service valves, evaporators, condensers and other equipment, *without the use of a wrench.*

Made in three styles—(1) For charging and gauge lines for field or shop service, or factory production equipment; (2) test hook-ups for evaporators, condensers, controls, etc.; (3) for testing equipment where only a tubing connection is provided for attaching.

No.17

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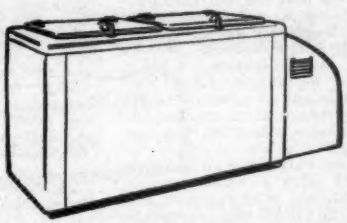

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Heavily built with steel welded frame, SANITARY Freezer Cabinets are now in limited production for **shipment** on a 30 to 60 day basis. Each cabinet is complete with freezer plates, cold control and Freon 12 expansion valve requiring merely installation of your own condensing unit. Every detail in these Freezer Cabinets is aimed at high efficiency at lowest operating costs.

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Ice Refrigerators For More Than 40 Years
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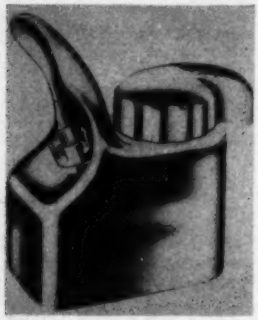
Water Bubbler

IMPROVED in design to eliminate those sudden spurts of water which oftimes have proven so devastating to both temper and clothing is a new and improved drinking fountain bubbler valve now being introduced to the market by the Ebco Manufacturing Com-



pany of Columbus, Ohio. The new bubbler provides greater drinking pleasure at the water cooler by permitting finger tip control of a full flow of water at any stream height without squirting or surging.

This new angle-stream bubbler has a self-closing valve and automatic stream control with a lever handle providing easy operation. A sparkling chromium plated bubbler guard adds beauty to the appearance of its modern design and meets all sanitary codes.

The valve has an all-brass body with a roller bearing operating mechanism and special alloy brass forgings. It is readily accessible for regulating the bubbler stream to any desired height. The valve has no screen, is nonclogging and will give years of trouble-free service, according to its manufacturer.

Tire-Trac

SERVICEMEN, here is a handy gadget for your car during the winter driving months. Known as a Tire-Trac Auto Traction Tread, it's a "half-trac" that will pull your car out of icy ruts, deep snow, or muddy roads. Made of seven, two-ply steel, electrowelded rust proof plates joined together by sturdy steel links with steels on both sides of each plate for sure traction. No more towing, pushing or dirty work. When your car is

stalled, just place the Tire-Trac in front of your rear wheels and drive away. Easily folded to fit your tool chest, the Tire-Trac also has a cable attachment to secure the Tire-Trac as you drive away. Announcement of its availability was made by The Harry Alter Co., Chicago.

Detect-O-Larm

A NEW low cost, temperature alarm system for use in frozen food and refrigeration cabinets, is now being manufactured by Turner Brothers, Inc., Ferndale, Michigan.

Known as the Detect-O-Larm, the unit consists of a simple thermostatic switch, powered by four dry-cell batteries. It is claimed that no servicing is required beyond the eventual replacement of the batteries. The alarm was specifically designed for installation in either new or existing frozen food and refrigeration cabinets as a

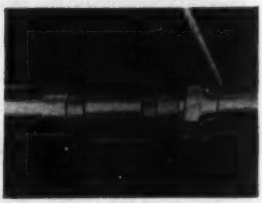
means of protection against food spoilage caused by rising temperatures within the cabinet. The unit is set and sealed at the factory to sound the alarm when the temperature rises 12 to 15 degrees Fahrenheit.

The thermostatic unit is simply placed in the bottom of the freezer or refrigerator and wired to a bell placed at any practical point desired, or any number of bells may be wired to several locations if necessary.

Thermostat is constructed of annodized aluminum with plastic ends having open circuit contact points connected in series with the batteries. Price is $9.90, bell included.

Stainless Fitting

THIN-WALLED stainless steel tubing may now be used in many piping installations where standard IPS stainless pipe is also used, utilizing a new stainless adapter fitting announced by the Electric Steel Foundry, of 2141 NW 25th Avenue, Portland 10, Oregon. The new fitting overcomes the obstacle formerly encountered in put-



ting pipe and tubing together in an easily assembled joint.

The use of this adapter fitting permits the incorporation of stainless tubing in lighter take off systems from an already established standard piping layout, and it also makes practical the use of tubing in place of the more costly standard stainless pipe in making installations where tubing would be equally suitable in other respects, according to the manufacturer.

It is called the ESCO P-T ADAPTER and is an addition to a full line of stainless steel flanged and screwed pipe fittings manufactured by Electric Steel Foundry.

The tubing is butt-welded to the adapter and thus is permanently fitted with standard pipe threads and can be assembled as any pipe. A system using this method is readily dismantled for cleaning or inspection.

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SOLDERING TOOLS

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"Thermo-Grips" are more than just ordinary soldering irons—they are handy electrical soldering tools designed to handle hard and soft soldering—sweating and unsweating threadless copper pipe and fittings, soldering terminals, lugs, etc.

Safe—no pre-heating or open flame hazard. The part touched heats almost instantly. Heat is concentrated on the spot to be soldered—no danger to nearby parts, walls or partitions.

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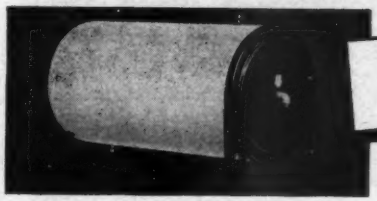

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Also available now—cafeteria glass filler coolers, self-contained type bubbler coolers for offices, stores or factories. Write for latest data.

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News of the Equipment Industry

FRIGIDAIRE BUILDS NEW CASE OFFERS HOME STUDY COURSE

LIMITED production of a new line of gravity cooling and forced air type display cases for groceries and markets has been started by Frigidaire Division of General Motors, P. H. Brennan, Commercial Sales Manager, announced today. With this announcement came the prediction that demand would probably exceed production for some time.

Mr. Brennan pointed out that six, eight and 10-foot gravity cooling models are being built in very limited quantities along with eight and 10-foot forced air display cases. "Production will be stepped up as fast as possible," he explained.

All models are equipped with sliding service doors, modern fluorescent lighting, and full-view display windows, consisting of three layers of glass. A built-in ventilation system prevents fogging of the glass. The gravity cooling cases are insulated with three inches of fibrous glass while similar insulation, but four inches thick, is used for the forced air models. A combination scale shelf, complete with paper holder and cutter to speed wrapping; porcelain platters and hardwood work boards will also be available as optional equipment on gravity cooled models and as standard equipment on forced air cases.

Home Study Course

A basic step-by-step home study course is being offered without charge to ice cream manufacturers to train servicemen by Frigidaire, P. V. Sprout, Service Manager, has announced.

The comprehensive study course, which covers the history of refrigeration, theory and principle, electrical and mechanical aspects of ice cream cabinet operation, is contained in a single, illustrated text comprised of 20 lessons. A practical test for the student serviceman follows each chapter. These textbooks are being forwarded to all Frigidaire District offices for distribution to ice cream manufacturers upon request.

The complete course covers construction and operation of high and low side float valve systems, operation of automatic temperature and expansion control valves and rotary unit electrical characteristics plus cabinet construction, equipment and controls in Frigidaire-equipped soda fountains. Tools and repair equipment are discussed. A training film, entitled "Service Operations On Ice Cream Cabinets," is also being distributed to augment the home study course.

"The primary purpose of this course," explained Mr. Sprout, "is to train men quickly in the fundamentals of mechanical refrigeration and to impart to them information necessary to properly service Frigidaire Ice Cream Cabinets. The study has been constructed along lines of simplicity and directness so that the beginner can learn, step-by-step, as he observes and works with reciprocating and rotary-type condensing units."

* * *

REWA REGION 6 OFFICERS ELECTED

MEMBERS of the Refrigeration Equipment Wholesalers Association, Region No. 6, met on December 6th in Chicago for their final meeting of the year. New officers were elected at this time who are as follows: Chairman—L. C. Keely, Airo Supply Co. Inc., 2732 N. Ashland Ave., Chicago 14, Ill.; Vice-Chairman—R. M. Potter, U. S. Electric Co. Inc., 218 E. Adams St., Springfield, Ill.; Secretary—P. Ravanesi, Service Parts Co., 2511 Lake St., Melrose Park, Ill.; Treasurer—I. Alter, The Harry Alter Co., 1728 S. Michigan Ave., Chicago, Ill.

* * *

CHADBURN JOINS HEAT-X-CHANGER

ROBERT A. CHADBURN, former refrigeration engineer with George G. Sharp, Naval Architect, New York City, and well known in the Marine Refrigeration field, has joined the Heat-X-Changer Co. of Brewster, New York, as Chief Engineer. Mr. Chadburn is a graduate of Stevens Institute of Technology and has had the responsibility of design of refrigeration systems on many maritime vessels. He comes to the Heat-X-Changer Company with a good background for the duties ahead.

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ALCO SHIFTS REPRESENTATIVES

LEONARD K. WRIGHT, JR., of Knoxville, Tenn., representing Alco Valve Company in southern territory, will be transferred to Columbus, Ohio, succeeding Hugo C. Smith, of Cleveland. The Ohio territory also includes western Pennsylvania and West Virginia, and eastern Michigan.

L. K. WRIGHT, JR.

Mr. Wright's former territory in the southern states will be taken over on the same date by William B. Knox, of Atlanta, Ga.

* * *

HOME PRECIPITRON IN PRODUCTION

FIRST production models of the new household Precipitron, the electro-static air cleaner that removes 85 to 90 percent of all dust in the circulating air streams in homes as large as eight rooms, have moved off the assembly line at the plant of the B. F. Sturtevant Company Division of Westinghouse Electric.

Home-owners will be able to buy a Precipitron either in a compact cabinet model about the size of a refrigerator, or built into a furnace unit by furnace manufacturers. The cabinet model will be sold by specially-authorized contractors throughout the country, while the Precipitron built into furnaces will be available through the furnace manufacturers' regular dealers. Production facilities covering 20,000 square feet of floor space for assembly-line manufacture of the Precipitron are expected to turn out initially hundreds of units each month.

Standing 52 inches high, 27 inches wide and 34 inches deep, the cabinet model is being made for use in conjunction with a warm air heating system or with an independent air circulating or air conditioning system. It will have an approximate selling price of $420 plus installation cost.

Operation of the air cleaner is based on the simple electrical principle that objects with like charges repel each other, and objects with unlike charges attract. Air to be cleaned first passes through an electrostatic field created by a "gate" of seven highly-charged hair-thin tungsten wires and eight grounded aluminum tubes, alternately spaced.

The new household Precipitron, the electrostatic air cleaner that promises to eliminate daily dusting drudgery. Developed by research engineers of the Westinghouse Electric Corporation, the device removes 85 to 90 percent of all dust in the circulating air stream in homes as large as eight rooms.

The air then enters the "dust collecting" cell which consists of 69 aluminum plates, alternately charged negative and positive, and set edgewise to the air stream. The charged dust particles are attracted to oppositely-charged plates with the result that only clean air leaves the unit.

High voltage direct current for the unit is produced from standard house current by the "energizer" which consists of electronic tubes, transformer and capacitor.

Cleaning the unit's dust-collecting plates is accomplished by turning a handle which releases five sprays of water that automatically wash away the dirt. Required about as often as a housewife defrosts her refrigerator, this flushing operation lasts three minutes, depending on the water pressure and the amount of dirt on the plates. Hot tap water is recommended for this purpose.

Installation of the cabinet model requires a water supply and drainage outlet, an electrical connection to the standard 115 volt alternating current supply, and air duct work to fit the unit into the home's heating or ventilating system.

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R. L. HOUGHTON WITH McCOMBS

H. R. McCOMBS, president of McCombs Refrigeration Supply Co., Denver, Colo., announced recently that R. L. (Dick) Houghton is now associated with the company. Dick will be working on the counter.

R. L. HOUGHTON

Dick is well known to all the trade in the areas of Denver, St. Louis and Kansas City. For some time he was counter man for Kelvinator distributor in the cities of St. Louis and Kansas City, and for the past year was associated with the Western Appliance Co., Kelvinator distributor in Denver. Dick is also active in the Refrigeration Service Engineers Society holding, at present, the office of secretary of the Mile High Chapter.

INTERNATIONAL HARVESTER REFRIGERATION LINE

A BRILLIANT new line of International Harvester Refrigerators and Freezers, some now in production, others soon to be, was dramatically presented recently before a large sales convention at the company's Evansville, Ind., refrigeration plant.

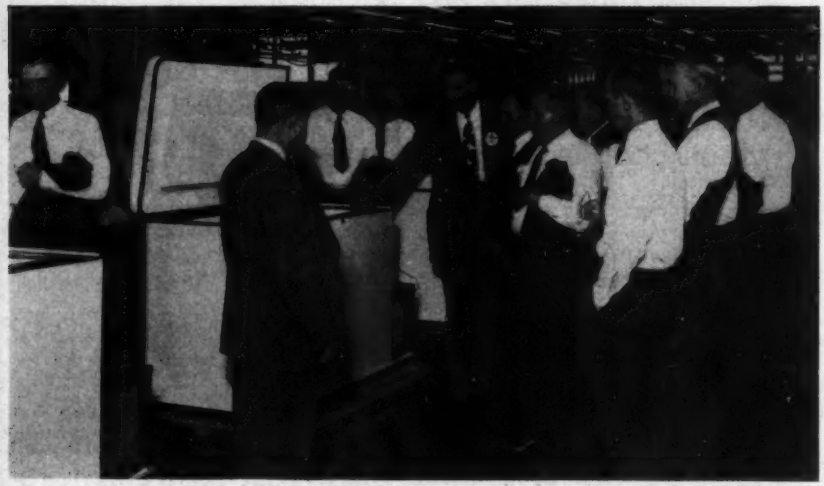
The meeting—which included more than 300 Harvester branch managers, assistants and other sales executives—was shown the nucleus of a line of refrigerators, single and two-temperature; freezers, chest and vertical—all in complete size and price ranges—all beautifully styled and with numerous important selling features.

The visitors were shown through the big Evansville plant in small parties, each guided by a member of the refrigeration division of which E. F. Schneider is general manager.

"Refrigeration is a young industry, comparatively speaking," Mr. Schneider said. "The market for domestic refrigeration is far from saturated. There is a big, new market for freezers as less than 200,000 of these units were in use before the war."

The group saw International Harvester's first new freezer—a model of full 11-cubic-foot capacity—coming off the assembly line; also milk coolers, one of the company's early refrigeration products which have been in mass production at Evansville since June.

International Harvester refrigeration sales are directed by T. B. Hale, vice president in charge of general line sales. Distribution is direct to dealers through a nation-wide network of company owned and operated branches.



E. F. Schneider, general manager refrigeration division, International Harvester Co., explains an operation on the new 11-cubic-foot freezer as it is about to come off the production line.

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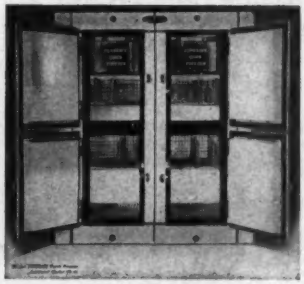

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WILSON REFRIGERATION, INC.
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HOFFMAN SUPPLY CO. IN NEW BUSINESS LOCATION

ON THE morning of November 20th, the new building and contents of Hoffman Supply Co., Springfield, Mo., were entirely destroyed by fire, starting from an undetermined origin and doing a damage of $100,000 to the building and stock of refrigeration supplies. The company had just completed moving to their new store the Friday previous to the fire, and had planned a big housewarming party in December. The plans, however, had to be abandoned and another new location found.

On Monday morning, December 2nd, the company opened again for business at 520 Boonville, with a complete new stock of refrigeration parts obtained largely through the help of other midwestern jobbers. The new opening was just six days after the fire, which should be a record.

S S S

R. H. MONEY OF REYNOLDS NEW PRESIDENT OF A.S.R.E.

R. H. MONEY, Refrigeration Advisor to W. G. Reynolds, Vice President, Parts Division, Reynolds Metals Company, Louisville, Ky., has been elected President of the American Society of Refrigeration Engineers. Mr. Money was Vice President of the Society during 1945-1946 and was active in forming a section of A.S.R.E. in Cincinnati, where he was Chief Engineer for the Crosley Corporation. He served as first chairman of this group. In the national organization, Mr. Money has been a popular figure and has served as chairman of the General Technical Committee and Membership Committee as well as holding membership on other committees.

R. H. MONEY

Mr. Money has had a distinguished career in the refrigeration field. He was associated with the Crosley Corporation in Cincinnati for 15 years—the first ten as Chief Refrigeration Engineer and during the war period as Manager of Crosley's Electro Mechanical Engineering (now known as Electro Appliance Engineering) a department which utilized the Crosley staff and technical facilities for the development of highly specialized war equipment. In early 1946, Mr. Money left Crosley to go with the Reynolds Metals Company, Louisville, Ky., to aid in the forming of the new refrigeration division of that company.

Since joining the Reynolds Metals Company, Mr. Money has been responsible for the designing and research which went into the development of the new Reynolds Metals home freezer, Eskimo Freeze, and is supervising the development of a future line of home refrigeration equipment which Reynolds plans to manufacture.

S S S

NEWCOMB NAMED SERVEL EXECUTIVE VICE-PRESIDENT

HARRY NEWCOMB, present vice-president and assistant to the president, was named executive vice-president of Servel, Inc., it was announced by Louis Ruthenburg, president.

HARRY NEWCOMB

Mr. Newcomb came to Servel in the Fall of 1934 as manager of the Commercial Refrigeration Division. In 1942, he was made vice-president and manager of the Electric Refrigeration Division, and in 1943 he was appointed assistant to the president, retaining the title of vice-president.

Previous to his association with Servel, Mr. Newcomb was with the Norge Division of the Borg-Warner Corporation. At one time he also worked with Mr. Ruthenburg, president of Servel, when they were both associated with the Copeland Refrigerator Company.

Born in Michigan, Mr. Newcomb is married to the former Miss Grace B. Moore of Evansville.

S S S

KOLD-HOLD OFFICIAL AND WIFE KILLED

FRED E. HEIDRICH, assistant treasurer of the Kold-Hold Manufacturing Company of Lansing, Michigan, and his wife, Hulda, were killed in an automobile accident December 9 near Cordele, Georgia.

marks a job on which the factory wants to cooperate with the service man. Service manuals, parts lists, and advice available on request. Call your local Servel distributor or authorized parts jobber.

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Mr. and Mrs. Heidrich were enroute to Florida on a well earned vacation when they crashed broadside into a Georgia highway department truck. They were 55 and 54 years of age respectively.

Mr. Heidrich served as treasurer of the Libby-Owen Glass Company of Toledo and was connected with the Hill-Diesel Company before joining the Kold-Hold firm about four years ago.

Surviving the couple are a daughter, Mrs. Ruth Gunn of Lansing, a son, Fred Heidrich, Jr. of Del Monte, Cal., and a grandchild.

N.A.R.C. GROWING

THE Refrigeration and Air Conditioning Contractors Association of Pittsburgh, Pa., with 14 member companies, is the 18th organization to affiliate with the National Association of Refrigeration Contractors.

This membership, together with the N.A.R.C. full company members, makes a total of 850 member companies in 38 states, the District of Columbia, and the Panama Canal Zone.

Officers of the Pittsburgh group are Robert B. Weston, president; H. A. Alexander, vice-president; and W. D. Armour, secretary-treasurer.

The association holds regular meetings to maintain a close cooperation between the members on problems of common interest. According to President Weston, this is of the utmost importance in the successful operation of any local organized group.

E. C. JAMES ELECTED STERLING SALES MANAGER

GEORGE W. CARROLL, President of Sterling Refrigeration Co. of Washington, D. C. and Omaha, Nebr., recently announced the appointment of E. C. James, present Vice President of the company, as General Sales Manager.

The Sterling Refrigeration Co. are makers of the "Living Level" Airconditioner, a commercial type 3 hp. air-cooled unit, and the Sterling Low-Temp truck unit.

MOBILE AIRLINE REFRIGERATORS

NOW you can add mobile refrigerators to the new equipment being utilized by the airlines for air freight shipments—this time to insure garden-fresh delivery of perishables.

United Air Lines announced it is purchasing five mobile trailer units equipped with temperature controls to provide for special ground handling of perishable air freight shipments at key points along its coast-to-coast and Pacific Coast system. Similar temperature-control facilities have been built into United's specially-designed fleet of Cargoliners, or flying freight cars.

The mobile refrigerators, manufactured by the Fruehauf Trailer Company, can be backed directly to a plane's cargo door for loading or unloading. Their 1,325-cubic-foot capacity makes them well adapted for storage.

The mobile units can be heated in cold weather up to 50 degrees Fahrenheit, and are automatically adjustable to keep any desired temperature from 0 to 50 degrees F. United plans to assign them to its Chicago, Detroit, Newark, New York and San Francisco stations, according to C. J. Rausch, director of cargo service.

In addition, the company is installing refrigerated walk-in boxes, each with a capacity of 620 cubic feet, in its air freight terminals at Boston, Philadelphia, Cleveland, Omaha, Denver, Sacramento, Los Angeles, Eugene and Oakland.

NEW CATALOGS AND BULLETINS

EMERSON-ELECTRIC capacitor-start motors are pictured and described in detail in a new four-page bulletin offered by The Emerson Electric Manufacturing Company, St. Louis, Mo.

Included in this bulletin are details of construction of the various parts of the motor, complete dimensions and diagrams and rating standards in accordance with the new NEMA fractional horsepower motor standards.

"Emerson - Electric Exhaust Fans for Business and Industry"—a new, informative catalog illustrating and describing various types of Emerson-Electric Exhaust Fans is also offered by The Emerson Electric Manufacturing Company.

This 16-page catalog is complete with helpful information on where and how to use exhaust fans, how to determine the size fan required and types and methods of installation.

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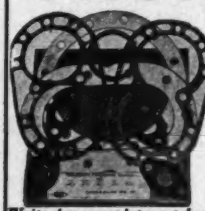

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Index to Advertisers

A-Abco Refrigeration Service 95
Acme Control Service 92
Airco Refrigeration Parts 87
Airo Supply Co. 87
Alco Valve Co. 15
Alter Co., The Harry 85
Ansul Chemical Co. 1
Armstrong, Jack 91
Automatic Heating & Cooling Supply Co. 83
Automatic Products Co. ..... 48 and 49
Bacharach Industrial Instrument Co. 93
Ben Hur Mfg. Co. 73
Betz Corp. 14
Blythe Co., H. W. 92
Boston Technical Institute 83
Brunner Manufacturing Co. 19
Capacitron Co., The 10
Chase Refrigeration Supply Co. 77
Chemical Sundries Co., Inc. 92
Chicago Seal Co. ..... Inside Front Cover
Chicago-Wilcox Manufacturing Co. 94
Circle Valve Repair 91
Commercial Trades Institute ..... 85 and 94
Conservative Gas Corporation (Modern Gas Division) 73
Cutler Hammer, Inc. 12
Davison Chemical Corp. ..... Inside Back Cover
Day & Night Mfg. Co. (Refrigeration Div.) 81
Detroit Lubricator Co. ..... 2 and 3
Du Pont de Nemours & Co., E. I. (Electrochemicals Dept.) ..... 4 and 5
Edison Cooling Corp. 85
Electrimatic 16
Flow Controls, Inc. 94
G & E Equipment Supply Co. 93
General Controls 13
G. K. Refrigeration Co. 92
Hasco, Inc. 85
Heat-X-Changer Co., Inc. 69
Henry Valve Co. 55
Highside Chemicals Co. 57
Ideal Industries, Inc. 81
Imperial Brass Mfg. Co. ..... Back Cover
Jamison Cold Storage Door Co. 53
Jarrow Products 91
Kelvinator (Div. of Nash-Kelvinator Corp.) 17
Keystone Engineering Corp. 91
Kinetic Chemicals, Inc. 18
Kramer Co., Fred C. 95
Kramer-Trenton Co. 71
Lynch Mfg. Corp. 21
Marsh Corporation, Jas. P. 59
McIntire Connector Co. 61
Mills Industries, Incorporated 9
Modern Design Products Co. 71
Modern Technical Book Co. 91
Mueller Brass Co. 6
New Duty 95
Paragon Electric Co. 75
Penn Electric Switch Co. 8
Peerless of America, Inc. 11
Premier Co., The 20
Ranco, Inc. 24
Refrigeration Control Service 75
Refrigeration Service, Inc. 93
Rempe Co. 87
Republic Electric Co. 93
Sanitary Refrigerator Co. 79
Sealed Unit Parts Co. 69
Servel, Inc. 89
Service Parts Co. 95
Shank Co., Cyrus 93
Skasol Corp. 23
South Bend Lathe Works 22
Sporlan Valve Co. 7
Standard Refrigeration Co. 51
Stangard Dickerson Corp., The 89
Superior Valve & Fittings Co. 79
Supreme Mfg. Co. 92
Temprite Products Corp. 63
Thermal Co., Inc. 89
Tinit Mfg. Co. 95
United Speedometer Repair Co. 93
Utilities Engineering Institute 77
Utility Thermostat Co. 94
Virginia Smelting Co. 28
Wagner Electric Corp. 67
Wagner Products Co. 83
Western Thermal Equipment Co. 75
White-Rodgers Electric Co. 26
Wholesale Refrigeration Repair Co. 94
Wilson Refrigeration, Inc. 87

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WANTED—A service engineer experienced in refrigeration. Can make a fine connection at once with a brilliant future in Omaha, Nebr. Send essential details as to past experience, and salary requirements in first letter to save time. Omaha Contract Branch of Baker Ice Machine Company, 4110 Commercial Ave., Omaha 11, Nebr.

WANTED—Large Refrigeration Organization has opening for service men. Must have at least 6 years actual field experience and be able to handle air-conditioning and commercial service. Must have own car, full set of tools. $1.95 per hour and time and one half for overtime. Can be kept busy year around with excellent earning. Address Box JA-6, The Refrigeration Service Engineer, 433 N. Waller Ave., Chicago 44, Ill.

WANTED—Progressive electrical manufacturer of parts sold by refrigeration jobber expanding sales program which will require representatives in following territories: Oregon, Washington, Texas, Oklahoma, Louisiana, Arkansas, Alabama, Tennessee, Mississippi, Georgia, North Carolina, South Carolina, Virginia. If interested, indicate lines now represented. Address Box JA-7, The Refrigeration Service Engineer, 433 N. Waller Ave., Chicago 44, Ill.

WANTED—Frosty Ball. I am interested in a frosty ball unit that is small enough to be installed in a house trailer, or a small unit that can be used with butane. Any one having the above for sale write Switzer, 6027 Atlantic Blvd., Maywood, Calif.

FOR SALE—Capillary tubes; send specifications as to refrigerant h.p., lowest temperature required and applications. We will send correct tube, calibrated tested and guaranteed, $1.00. J. L. Ammons Co., 1916 W. 6th St., Amarillo, Texas.

FOR SALE—2 new Marlo evaporative condensers Model EC7-½. These condensers will handle a 15 h.p. condensing unit and are complete in every respect. P. A. Prendergast & E. F. Kertzman, Room 408 Exchange Bldg., Winona, Minn.

FOR SALE— Sealed Unit Compressors Remanufactured. We offer you guaranteed service on exchange compressors. All makes $35.00 and up F.O.B. Detroit. One year guarantee on mechanical parts and workmanship. We will buy your old Sealed Unit compressors, postage paid $5.00 each. Write us for shipping instructions. Penguin Products Co., 21555 Grand River Ave., Detroit 19, Mich. Garfield 7332.

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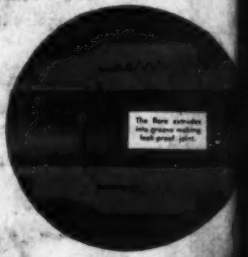

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